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PSYCHOSOMATIC DISORDERS AND THEIR THERAPY

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ONE THIRD of all patients who consult a physician have symptoms which either cannot be explained by, or are out of proportion to any physical disease that may be discovered (10). Thorough enquiry into the history of these patients usually reveals a pathological emotional life, which is directly contributory to the symptom formation. The physician is then in the quandary of deciding whether to seek advice from his psychiatric colleague who is already busy with an equally large group of patients who have no definite bodily disease to account for their illnesses, to apply psychotherapy himself, or merely to treat the organic basis and let the psychopathology take care of itself. However, if the general practitioner does not treat these patients with the scientific psychotherapeutic techniques at his disposal, no one will treat them and they will eventually find their way to the doorstep of the quack. The general practitioner must not think of psychotherapy as being essentially a specialist's technique because, just as there are minor and major surgeries, there are minor and major psychotherapies and it is the general practitioner's duty to be able to perform these minor branches of those specialties.

If the non-specialist is to deal with psychosomatic problems, then how is he to recognize them, to assess them, and to treat them? The most important requisite is the proper attitude of approach to them. This can be obtained only by understanding the powerful role which emotions play in the development of the bodily reactions characteristic of each individual.

THE DEVELOPMENT OF PSYCHOSOMATIC DISORDERS

Emotions derive their energy from the unconscious portion of the personality which is the source of one's life energy, instincts and primitive drives. The unconscious contains, at birth, the psychological heritage of the organism which is characteristic of his species. It stores the accretions of the individual's development: the forgotten experiences and memories and all of the urges to forbidden activities and desires which are repressed because of parental influence, training, experience, social demands and culture. From birth through the first years of life the growing child develops a conscious personality through which he maintains contact with his environment. As he becomes a mature individual, he learns that society demands that he exercise judgment and direction over the superior power and drives of his unconscious. To the conscious portion of the personality belongs the responsibility of seeing that the expressions from the unconscious

conform to socially acceptable standards and approval.

Usually, the first indication that the conscious personality cannot control a threatened escape of a primitive impulse or urge is a feeling of anxiety. The apprehensiveness, restlessness or fearfulness, all of which are expressions of a conflict between unconscious pressure and conscious control, can be removed, in very few instances, by changes in the environmental situation. Usually, the conflict can be resolved if the individual gains a better understanding of the factors in his situation to which he is reacting. If the conflict is not resolved, the personality is forced to utilize one of many possible forms of automatic defense.

One such defense is to channel the initial impulse into symptom formation: some disturbance of gastrointestinal or cardiovascular function, curiously distorted fears, bizarre compulsive behaviour, affections of motor, sensory or visceral functions. As Weiss (10) states, these patients are like engines with the steam up. If the energy (steam) is not utilized in productive work (making the wheels go round), or if it is not allowed to escape by discussing the problems (blowing the whistle), then it will burst through some other part of the organism (the boiler) which was not primarily designed for the purpose and which therefore jeopardizes the integration and efficient functioning of the whole. Thus, if the tension cannot be expressed by motor or verbal function, it will be expressed by visceral dysfunction. Weiss and English (11) cite many examples of this "organ language": dysphagia may symbolize something in the life situation which the patient "cannot swallow"; nausea may indicate that he cannot "stomach" certain situations; pruritus may indicate that he lets things "get under his skin".

It is very important to understand that the individual himself is no more capable of voluntary control of such symptom formations than of the cardiac rate. At times, everyone manifests such neurotic symptoms but these do not represent ill health any more than do the minor impairments of any other biological system. If the symptoms are severe enough to cause incapacity due to the breaking down of the defense mechanisms, the point has been reached where the unconscious has temporarily subjugated the weakened ego functions which include these mechanisms. Weakening of these functions is usually treaceable to a psychological trauma during infancy and early childhood. The "mental scar" that results from such trauma has all the properties of a physical scar: it cannot react efficiently to environmental stimuli but functions solely by maintaining the integrity of adjacent areas. Thus, in adulthood, when an experience is encountered similar to the one which caused the childhood trauma, this "scar" in the personality cannot respond or adjust to the environmental situation in the most efficient manner. Tension is created and symptom formation begins.

To put the matter in physiological terms, psychological conflict, which presumably occurs in the frontal lobes, causes excitation of the hypothalamus which has often been referred to as the "centre for emotions". Such excitation may be prevented by the cutting of the fronto-thalamic tracts—this is the rationale for pre-frontal leucotomy. Hypothalamic stimulation in turn stimulates the sympathetic nervous system with the resultant secretion of epinephrine by the adrenals. Long (5) has

demonstrated that epinephrine is one of the most potent factors producing activation of the anterior lobe of the pituitary with the release of its trophic hormones to the thyroid and the adrenal cortex. Excessive activity of this latter gland disrupts the ability of the organism to adapt physiologically to a great variety of stresses as pointed out by Selye (8) in his description of the "adaptation syndrome". This chain reaction demonstrates the close interrelationships of the three mechanisms which maintain environmental adaptation: the nervous system, the endocrine system, and the intracellular enzyme systems.

Mirsky (6) considers diabetes mellitus to be one of the results of acceleration of this chain reaction. According to him, the diabetic patient is a person who previously possessed inadequate physiological regulatory mechanisms which have permanently failed as a result of either too frequently repeated emotional excitation or "the forces of the environment becoming relatively excessive as in the advent of some psychologic trauma and/or the revival of some infantile conflict." These conflicts, occurring, as suggested, in the frontal lobes, accelerate the chain reaction producing excess adrenal cortical activity with resultant disruption of carbohydrate metabolism. Long (4) has experimentally verified these end results by demonstrating that adrenalectomy attenuates existing diabetes in the depancreatized dog and that subsequent adrenal cortical tissue grafting results in its exacerbation.

Mirsky considers that it is no coincidence that from fifty to seventy percent of diabetic patients have a history of obesity, although the obesity could not be the cause of the diabetes because only about five percent of obese people develop diabetes.

Obesity, like diabetes, has its precipitation in psychological factors. Bruch (1) has investigated most thoroughly the importance of these factors in its production. Obese persons are emotionally immature, passively dependent people who are helpless in meeting the exigencies of life. As a defense against anxiety, and as a source of immediate satisfaction of at least one of the appetites, the obese person reacts to the frustrations of the present by regressing to a form of behaviour which provided gratification in the past. All the infantile associations with pleasurable sensations, the relief of tension, and the presence of a loving protecting person are revived. Food symbolizes all that is desired and thus by over-indulging in this primitive form of oral behaviour, the obese person, like the chronic alcoholic, avoids the problems of life.

Szasz (9), who is associated with Dragstedt at the University of Chicago, studied a series of sixteen peptic ulcer patients who had undergone vagotomy. He suggests that the post-operative results might be improved by encouraging the patients to continue with certain psychologically meaningful aspects of their pre-operative medical regimens, particularly the drinking of milk with its symbolic oral gratification. The etiology of the condition is thought to lie in a psycho-physiologic chain of events occurring in a person who suffers from a conflict between dependent needs and strivings for independence. The ulcer is the regressive "solution" of this conflict in the face of frustration of the dependent tendencies. Szasz considers that vagotomy is probably the treatment of choice in patients who will not be treated by psychoanalytic psychothera-

py which, in most cases of peptic ulcer, is the only etiological treatment.

The full list of psychosomatic disorders cannot be considered exhaustively here, but some indications have been given of the interplay of psychological and physiological factors in the production of diabetes mellitus, obesity and peptic ulcer. More thorough discussions of these and other diseases may be found in the texts by Dunbar (2) and by Weiss and English (11).

THE TREATMENT OF PSYCHOSOMATIC DISORDERS

The investigation of these patients is essentially the same as for any medical patient: a thorough physical examination, the pertinent laboratory and other technical tests, and above all, a well-taken history. The physical examination should be done after the history has been taken and every system should be examined once and once only. The taking of notes at the time will relieve the necessity of "over-examining" which gives the impression to the patient that some system warrants extra attention and therefore must be seriously involved. These patients are quick to perceive such attention and this only accentuates the symptoms of that system.

The history must be taken carefully and thoroughly because with its taking, the therapy begins. The patient's account should be allowed to come forth spontaneously and not be forced into a chronological order. This can always be worked out later and many an important fact has been missed by an interruption demanding the patient to proceed by dates. The family history is not a recital of "Father—65, a. & w.; Mother—d. 64, cerebral hemorrhage," but rather the determination of the experiences which the patient has had in relation to those who helped—or, sometimes, did not help—his start in life, and his subsequent dealings with them. The personal history is probably the most important diagnostic aid which the physician has for dealing with these disorders. Dostoevski has said that there are some things a person will tell only his friends, some things he will tell only himself, and some things he will not tell even himself. In this ascending order, the facts of the personal history are of value to the physician. If he does not listen, he will not hear the first. If he is is not tactful and trustworthy, he will not hear the second. If he is not patient and understanding he will not hear the third. It is the recovery of this third category of facts that the physician is seeking.

To understand the procedure of psychotherapy, one must first be able to recognize the meaning of human behaviour. Both phylogenetically and ontogenetically, feeling and acting preceded thinking and this pattern endures to some extent in all adults, more so in the emotionally immature. Pareto states that residues, manifestations of instincts or sentiments (7, sec. 875), impel men not only to action but also to the residues' verbal expressions which frequently develop into moral, religious and like theories. In our social behaviour, there is rarely a direct relation between the action, the derivative, and the verbal expression of the residue, the derivation, and in these cases the behaviour is non-logical, that is, the objective end of the action differs from its subjective purpose (7, sec. 151). Although the behaviour is non-logical, by virtue of their possession of an intellectual faculty, humans try to explain or justify all that they do and thus to make their behaviour appear

logical. That is, they try to establish a direct relation between the derivative and the derivation when, in reality, there is none. However, "the need of logic is satisfied by a pseudo-logic as well as by a rigorous logic. Men want to reason, and it matters little to them whether they reason well or ill" (7, sec. 972). In spite of the fact that these actions are non-logical, their social utility is often very great and because of their ability to move the emotions of other men, the behaviour of large masses of people may be controlled.

The matter may be better explained by distinguishing between logical, non-logical and irrational actions. For example, if a gentleman removes his hat because the wind might blow it away, the behaviour is logical; if he removes his hat in the presence of a lady, the behaviour is non-logical; if he removes it to hurl it to the ground in a rage, the behaviour is irrational. Though in each case the action appears the same to the casual observer, the underlying state of mind is vastly different and in its understanding lies the true meaning of the situation.

In dealing with human problems it is important to differentiate between logical and non-logical actions. Those who are adept in handling factual matters, as all physicians are trained to be, are often poor at handling human relations, because they are constantly confusing fact with sentiment, that which is manifested by the residue. For example, it is useless to argue with a friend who states that the weather is too cold to go walking, even though he is shown a thermometer which registers a moderate temperature. The more he is reasoned with logically, the more he is antagonized. If it were understood that the friend's statement is only a derivation of the residue resulting from the fact that he has been busy all day and is now too tired to go walking, then an agreeable adjustment would be more likely.

This example points out some important facts (3) applicable to psychotherapy. Thus arguing, moralizing, advising, and using logic will not alter the patient's behaviour because his statements are not logically connected with his actions. Moreover, these devices will only place an added strain upon the physician-patient relationship because the patient will feel he is not understood. The physician must be able to see beneath the manifest content of the patient's conversation into the deeper underlying emotions which are causally related, although in an individual manner. To ensure that he is not trapped in any of these pitfalls and, therefore, to ensure that the patient's sentiments do not react upon his, the physician must have a deep insight into his own psychological mechanisms. Once he is capable of quickly translating all that he hears into the emotional counterpart, he is ready to enter into the highly structured relationship involved in psychotherapy.

The first essential is that there be some means of communication between the doctor and his patient. Probably the most scientific means is that of free association, in which the patient allows one idea to lead him to another, closely related one. In this manner, the patient discusses a number of his own life situations in intellectual terms which the physician interprets on the emotional level. When a number of these situations have been recounted, the physician may perceive a common denominator in the behaviour patterns, that is, he may note that the patient reacts to similarly

structured situations with emotions that are almost identical.

The stage of interpretation may commence when the physician has appreciated the similarities in the patient's behaviour from situation to situation. This should be done first on the "horizontal plane" by pointing out how contemporary situations arouse certain emotions. For example, the patient may not enjoy his work because his foreman is a trifle overbearing and this symbol of authority arouses feelings of resentment and hostility. The same feelings may be aroused when the patient is required to take a role subordinate to a more dominating personality in certain social situations. Later, the interpretation may proceed on the "vertical plane" in which the present modes of reaction are traced to older ones of similar nature. Thus, the feelings of resentment and hostility toward authority may stem from unpleasant memories of a harsh and tyrannical father who was the cause of much domestic discord.

Throughout the entire psychotherapeutic procedure there will be catharsis of emotions, in small amounts, as certain "tender" areas are probed. This catharsis may be expedited and the free associations kept from wandering afield by the simple means of restating the patient's intellectualizations in emotional terms. For example, if the patient says, "My father raised me very strictly," the physician will be getting closer to the point if he rhetorically asks, "You felt he was unduly harsh?" By this means and by listening patiently, without interruptions except for these occasional "translations," and by avoiding at all costs the fatal error of entering upon intellectual skirmishes with the patient, the basic conflict is soon reached.

Insight is achieved when the patient perceives the relationship between his symptoms and the previously unconscious pattern underlying them. Thus he may come to realize that the aggravation of his ulcer pains which occurs after a work situation involving close contact with his overbearing foreman originates in his early ambivalent feelings toward his father—his sense of duty to the family head and his concomitant desire to be rid of him. This intellectual apperception, which spreads to other situations by the Gestalt principle of closure, goes hand in hand with its emotional counterpart. With the insight, the patient may experience one of many emotions depending upon the nature of the basic conflict and its meaning to him at the moment. The realization of his ambivalent feelings toward his father may cause the patient to feel a sense of guilt, of relief, of anxiety, or of happiness. The physician must recognize this emotion in his patient at the crucial moment of insight, for it is through its manipulation that resolution of the conflict will be attained.

The real work of psychotherapy begins when insight has been achieved. Insight alone is not sufficient because it is essentially an intellectual process which is powerless to affect the emotions, as we have pointed out in our discussion of the effects of reason on non-logical actions, but insight is one of two necessary achievements for the stage of "working through." Shortly after psychotherapy begins, the patient adopts a particular attitude toward the physician which is involved in the rapport situation. This attitude consists of the identification of the physician with a friendly, parental figure upon whom all the emotion loosed from the conflict situation may be attached. By

means of this attachment the physician is able to direct the emotions of the patient into those new channels created by the patient's own intellectual insight. It must be understood that this guiding of emotions is not identical with the forcing of new behaviour patterns upon the patient because this latter process is worse than useless. True re-education is the selection, *by the patient*, of his new goals and his new patterns of behaviour in the light of his new knowledge of his own psychological mechanisms. The emotional attachments of the patient to the physician are released by the latter, slowly but surely, so that the patient does not suddenly find himself overwhelmed by a new pattern of life. This release is achieved by the discussion and analysis of the patient-doctor relationship so that it is seen in its true light—a particular example of one of the "horizontal" life situations previously discussed.

Psychotherapy in psychosomatic disorders must, of course, proceed hand in hand with the physical treatment of any organic basis. With a balanced psycho-physiological orientation to the patient and to his difficulties, the general practitioner is able to offer a more comprehensive therapy and to secure a more effective remission.

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MUNICIPAL MEDICAL CARE IN SASKATCHEWAN[1]

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DURING THE past few years, much interest has been centered upon the development of health and hospitalization insurance plans by the people of Saskatchewan. Little attention has been paid, however, to a scheme which had its birth and its greatest development in that province and which has paved the way for many of the present advances in health service plans. This is the system of medical care evolved by the municipal governments[2] in that province.

Although the first of these plans came into existence in 1916, few attempts have been made to gain definite information on the methods of operation, costs, benefits or coverages of these schemes. Dr. Rufus Rorem, in 1931, made a partial survey but his work seems to have been confined to an investigation of only a few of the better known ones. In 1941, Dr. R. O. Davison, then Deputy-Minister of Public Health, published several articles on this work but these, too, described only a few plans and made no attempt statistically to generalize about all of them. Last summer (1948), the Health Service Planning Commission of the Saskatchewan Government decided to try to compile as many data as possible about these plans, and the author was given the opportunity of working on this survey. It is on the results of this survey that this article is based.

In order to gain any understanding of the development of these municipal medical care plans, it is necessary to know something of the more important factors influencing it. The first is population. What might be termed the well settled districts of Saskatchewan comprise an area of about 112,000 square miles and have a total population (840,000) only slightly greater than that of Toronto. The largest city, Regina, has a population (85,000) somewhat less than that of London, Ontario. Thus the residents are distributed rather uniformly over the area giving a population density of about 8 persons per square mile. The second important factor is the agricultural nature of the province's economy. This, together with a further specialization in wheat farming, results in great fluctuations in the annual income of Saskatchewan. Consequently, although the people may be able well to provide for private medical care one year, they may be totally unable to do so three years later.

Consequently, during the depression after World War I, the doctors in Saskatchewan found themselves trying to maintain widely scattered practices composed of people who, individually, were unable to pay for the services which they required. In many instances, the doctors were forced to move to other parts of the country in order to make a living. Such conditions forced the municipal governments to seek a solution to these problems and, in 1919, the Municipal Act, their enabling legislation, was amended to allow them to hire physicians for the care of their residents.

By 1931, when Rorem published his survey, there were thirty-two of these plans in existence in the province. About

[1]Published with the permission of the Saskatchewan Health Service Planning Commission.

[2]A rural municipality in Saskatchewan is the unit of local government. Usually, it is an area eighteen miles square. It is governed by an elected reeve and six elected councillors. It does not include incorporated towns and villages located within its land area.

this same time, the great depression of the "Thirties" introduced a new problem. The municipal governments were legally responsible for the medical care of the indigents within their boundaries. From 1933 to 1937, in the majority of areas, these included most of the residents. The few remaining tax payers who were not receiving municipal medical care were a little indignant, naturally, about having to provide it for others while having to pay for their own medical care on a private basis. Many more municipalities, therefore, began to offer their doctors flat salaries for the care of all residents. By 1941, according to Dr. Davison's report, the number of plans had risen to ninety-seven. Although the present survey is still being completed at the time of writing, it is estimated that there are from one hundred to one hundred and ten plans in operation now.

If, in true medical style, we were to classify these plans, we might do so in the following manner:

A. Plans providing only medical care.
B. Plans providing medical and surgical care with
    1. Limited referral services
    2. Unlimited referral services.

Plans providing only medical care are the more common and comprise about sixty percent of the total. Typically, they are schemes whereby the doctor is paid a basic annual salary averaging about $3.50 per person residing within the municipal area. For this sum, the doctor contracts (*a*) to provide medical care, (*b*) to provide obstetrical care, (*c*) to do minor surgery (usually construed as being procedures which can be performed in the doctor's office), (*d*) to hold immunization clinics for, and periodically to examine the school children, and (*e*) to act as the medical health officer for the municipality. In an average municipality, under such a plan, the basic salary is about $6,000 per year. Usually, the doctor can augment this income by performing major surgery which is not included in his contract, by making contracts with other rural districts, and by operating private practices in the towns and villages of the municipality as well as in any neighbouring, unorganized municipalities. Most of these doctors are using what is known as the "model contract." This is a form of contract which was drawn up by representatives of the Association of Rural Municipalities, the College of Physicians and Surgeons, and the Health Services Planning Commission, all of Saskatchewan. By making grants to approved health plans, the Commission has succeeded in having this contract adopted by most municipalities. The "model contract" has many safeguards for the doctor and provides him with (*a*) an annual three-week holiday with pay, (*b*) a cumulative, biennial leave for post-graduate studies, (*c*) leave to attend the meetings of the district and provincial medical societies, and (*d*) security against unfair termination of his contract.

Some municipalities operate plans which include surgery but provide payment of only the local doctor and so patients requiring referral to any outside specialist must pay for his services themselves. In other places, the plans provide for payment of specialists referral charges under certain conditions. There is great variation in the operation of such plans and in nearly half of them, at least part of the services provided are purchased on a fee for service basis. In that portion of Saskatchewan already surveyed, the average cost to the municipalities is $7.23 per person for plans including surgery with unlimited referral services, but the costs range from $4.90 to $12.60 per capita.

There are several methods by which the municipalities raise the funds to pay for these services. Perhaps the most

common method, and the one used almost exclusively for those plans which do not provide surgical service, is to appropriate the required funds from the consolidated revenue of the rural municipality, raising the land tax the amount necessary to cover these expenses. In the more complete, and therefore more expensive, plans, there is a tendency to finance them by a per capita tax with a maximum charge per family which, under the present provincial enabling legislation, cannot exceed $40.00. Other areas use a combination of these methods, assessing a land tax on ratepayers and a personal tax on non-ratepayers. It is interesting to note that although one of these methods usually would be defined in medico-economic circles as "state medicine" and the other as "health insurance," yet, locally, there seems to be no recognition of this significant difference.

The coverage of these plans is remarkably extensive. During the past summer, the author surveyed seventy-six plans covering a total of 113,732 persons. Taking into consideration the additional people from towns and villages who are covered by contracts with local doctors for the same type of service and those people covered by plans yet to be surveyed, it is estimated that the number of persons receiving medical care by some one of these arrangements would total nearly 200,000 and that almost one third of the doctors in Saskatchewan derive at least a part of their practices from one of these schemes.

In an experiment in social medicine of the magnitude and duration of this one, it is important to examine the degree to which it has been successful. In general, from the viewpoint of the municipalities, the plans have served their purpose. Very few of the original ones have ceased operation and although they were originally organized to make medical services available, yet, over the years, they have also educated the people regarding the advantages of insuring against accidents or illness. A few of the difficulties commonly cited by the people are:

1. The *personality of the doctor*. It is almost imperative that a doctor employed in such a plan be capable of tactfully leading and handling people. He must create, for himself, desirable conditions of practice and he must do so without antagonizing the people for whom he works. It would be desirable for him to be the type of person who enjoys entering into community life because this tends to establish much better relations with his local municipal council and with his patients.
2. The *growing centralization of medical practice* with its emphasis on *hospital services*. This means that doctors are now grouping themselves in twos and threes in places where there are reasonable facilities for medical care. Consequently, it is difficult to find doctors who will reside in a municipality where such facilities do not exist. Only now are the plans evolving so as to employ doctors situated outside of the local governmental area.
3. The people's *lack of knowledge and understanding* of the changing methods of medical practice. For example, now, most doctors refuse to travel long distances to make house calls, and, except in emergencies, they request that the patient be brought to the hospital where facilities for treatment are available. Such problems have created bitterness in some areas, but they will disappear as the people served by these plans acquire a greater understanding of medical practice and its problems and their solutions.

From the viewpoint of the doctors,

the main advantage of these plans is that there is a guaranteed basic income for both good and poor years. Many of the older doctors claim that rural practice would be impossible over any long period of time without some such guarantee. The annual earnings, at the present time, are probably lower than those of well established private practices, but most doctors feel that, over a period of years, the remuneration is quite equitable. For the young physician, these plans provide an opportunity to start in an established practice rather than to begin by facing the hazards of building up one at a time when his financial resources are at their lowest ebb. Most of the doctors say that their relationships with their contract patients are as good as or better than they would be in private practice. The disadvantages which they commonly cite are:

1. *Local supervision.* Many doctors feel that there is too close supervision of their work by the local councils and that larger units, administered, if possible, by medical men, would be preferable. It is interesting to note that there now seems to be a tendency for adjacent municipalities to consolidate their plans, thus helping to solve this problem.
2. *Misuse of the service* by hypochondriacs and persons who feel that they want to get "their money's worth." This complaint is heard less often than one might expect, however, and many doctors, especially those who have been working in these plans for some years and who have spent some time in the education of their patients, report that they receive excellent cooperation and consideration from the people.
3. *Too low a rate of payment.* This is a natural human complaint, yet from the author's observations, it is estimated that the average income of the doctors working in municipal plans is considerably higher than the figure given for practicing doctors across Canada by a Report of the Dominion Bureau of Statistics in 1946.
4. *Lack of a choice* of doctors for the patients and of a choice of patients for the doctors. This, it is believed, is a genuine complaint against the system, but the tendency to operate in larger units with several doctors under contract will help to alleviate this situation.

Although the system of municipal medical care developed so far is not an ideal one, it does seem to have served its purpose locally. Through the efforts of the Health Services Planning Commission during the past few years, much has been done to make conditions more favorable for the local doctor and to provide better services for the people involved. The plans still remain locally operated but, as has already been mentioned, there is now a very desirable tendency to enlarge the units of operation. Just how far this trend should go and what degree of centralization should result are questions which cannot be answered at this time.

Out of this system of medical care evolved by the municipal governments has grown a demand for broader health services. As a result, the Saskatchewan government is providing hospitalization insurance and facilities for the diagnosis and treatment of cancer, tuberculosis and mental diseases without cost to the individuals. There has been established in the province an experimental health region of 50,000 people where all medical, surgical, and most dental services are provided on an insurance basis. It is a movement which is still in a state of flux and one which students of medical economics might well follow with interest during the years to come.

INTRAVENOUS NOVOCAIN

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During the past five years, the intravenous administration of novocain (procain) has been extensively investigated. Although much of the work is still in the experimental stage and although the explanation of the action of novocain is still largely theoretical, yet many clinical applications of the drug have been developed already. From reports by various workers regarding its widely varied clinical applications it is evident that this drug is a valuable agent in anesthesia and therapeutics and will become even more so with an increased knowledge of its pharmacology and its applications.

Following its introduction in 1905, novocain became an important local anesthetic. Its intravenous administration was reported first by Bier in 1908 in Germany. He injected novocain into a limb which previously had been drained of blood by a pressure bandage and then shut off from the general circulation by a tourniquet. At the time, this was considered to be a dangerous procedure because of the fear that the tourniquet might slip and allow toxic doses of novocain into the general circulation. It was not widely accepted on the Continent or in England.

About the same time, vasopressor substances were added to local anesthetics to prolong their action. The mortality rate following intravenous injections of novocain suddenly increased and consequently the procedure was discontinued. It has been suggested that these deaths may have been due to the epinephrine, though a very high concentration of it would have had to be used; or to the fact that the toxicity of novocain is trebled by the addition of epinephrine.

In North America, prior to 1940, any intravenous administrations of novocain were purely accidental except for a modification of the Bier technique introduced by Herreros in Mexico. In September 1940, Lundy of the Mayo Clinic reported the administration of dilute solutions of novocain intravenously for the relief of pruritis in jaundiced patients. For continued effects, he gave 1 gram of novocain in 1 litre of saline by continuous intravenous drip over a period of hours.

In 1943, Gordon of tke Royal Canadian Army Medical Corp in England, using a series of ten cases, was able to demonstrate that intravenous novocain would relieve the pain of burns and provide analgesia during transportation and dressing. In each case, significant relief of pain occurred within a few minutes of the beginning of the intravenous administration of the drug and without any signs of any untoward reactions. All of the patients were conscious and alert during dressing. They experienced analgesia in the wound area but not elsewhere. Usually, pain did not return within 10-16 hours. The actual periods of infusion ranged from 10 to 70 minutes.

Thus, Lundy demonstrated the safety of giving low concentrations of novocain intravenously and Gordon showed its specific application in the treatment of burns, and opened the field for further investigation. In 1945 and 1946, Allen described its applications in obstetrics. In 1947, Graubard reported its use in the relief of pain due to a wide variety of traumatic and inflammatory conditions. Meanwhile, French workers were studying its value in such conditions as asthma, pulmonary embolism, and angina.

ACTIONS

The mode of action of intravenously administered novocain is not well understood, but certain features are known. In low concentrations, it acts almost solely on the peripheral nervous system with little or no central effects. This is exemplified by its use in the treatment of burns, as shown by Gordon. In higher concentrations, it also acts on the central nervous system to produce anesthesia and a partial loss of consciousness. Ordinarily, the patient retains his memory and his ability to follow instructions. Allen has made use of this effect in his applications of intravenous novocain in obstetrics. Apparently, it hastens rather than slows the second stage of anesthesia.

Production of analgesia due to the peripheral effect is attributed to the circulating novocain leaking out of the vascular system at the site of injury and causing local analgesia. Nerve fibres are acted upon in ascending order of size. Thus the smaller afferent fibres are affected first and the larger ones are anesthetized by higher concentrations. If this explanation is correct, then pain of purely mechanical origin and unassociated with inflammatory exudate should not be relieved by novocain. It is true, of course, that pain is often associated with inflammation and increased vascular permeability. Clinically, this is borne out, because all types of pain so far treated except that due to a protruded intervertebral disc, are materially relieved.

The only other action of novocain which is supported by adequate laboratory evidence is its effect on the heart. It constantly reduces fibrillation in dogs. Clinically, it is effective in combatting cardiac arrythmias which result from the use of various anesthetics, especially cyclopropane, or from the direct handling of the heart and cardiac nerves during thoracic surgery. Novocain can revert a displaced pace maker to the sinus node. It reduces the excitability of the cardiac extrinsic nerves, slows the conduction of the Bundle of His and, like quinidine, prolongs the refractory period of the myocardium. It effectively stops fibrillation but probably does not prevent it.

Following the intravenous injection of novocain, patients volunteer the information that there is a comfortable relaxed feeling accompanied by a generalized sensation of warmth, lacrimation, and a metallic taste. Other observable effects are variable increases in pulse and respiratory rates, flushing and some decrease in blood pressure, especially in hypertensives.

Other actions of novocain which have been described include:(1)Antihistaminic action. Few data are available on this subject but in dogs novocain does not inhibit the stimulus to gastric secretion by histamine. Chemically, novocain is *p*-aminobenzol-diethylaminoethanol. In the body, two reactions take place: hydrolysis of novocain to *p*-aminobenzoic acid and diethylaminoethanol, and then acetylation of the *p*-aminobenzoic acid. Structurally, the diethylaminoethanol is analogous to benadryl and may have a similar antihistaminic effect. This action may account for the clinical success in the treatment of asthma, urticaria and other symptoms of allergic states. (2) Anti-acetylcholine action. This may account, in part, for the successful use of intravenous novocain in the treatment of serum sickness. (3) Epinephrine-potentiating action. This is a rather confusing concept because epinephrine is an effective antidote for novocain.

TOXICITY

All patients being given novocain intravenously should be tested first for sensitivity to the drug either by intracutaneous injection or by placing a few drops in the conjunctival sac. During routine tests, less than 1% of patients show any sensitivity—an incidence which may occur with any drug.

The rapid detoxication of novocain by the liver permits large amounts to be given intravenously over a prolonged period of time. The addition of glucose to the solution of the drug further increases the margin of safety. It may be detoxified in other tissues besides the liver.

Convulsions are the most feared toxic reactions. Novocain certainly is a convulsant drug, but the danger of inducing convulsions when it is used judiciously has apparently been greatly overrated. It has been found that the prophylactic use of a barbiturate, or the slow administration of the novocain, readily controls the occurrence of convulsions. According to the reports by Allen on the use of intravenous novocain in obstetrics, convulsions were not a troublesome problem. Apparently, they tend to occur during the stage of semi-consciousness which precedes unconsciousness when the drug is used as a central anesthetic. Workers using lower concentrations for their peripheral effects only, keep below the amount producing such minor toxic symptoms as dizziness, giddiness, mental confusion and thick speech. The severity of the toxic reactions varies directly with the amount, the concentration and the rate of administration of novocain. Graubard recently established a procedure for controlling these variables. He recommends giving 4 mgm. of novocain per kilogram of body weight as a 0.1% solution over a period of 20 minutes. Thus a 70 kgm. man would receive 14 cc. of a 0.1% solution of novocain per minute.

CLINICAL APPLICATIONS

There are many and varied applications of intravenous novocain. Only the more important and more successful of these will considered here.

As was discussed earlier, Gordon was able to demonstrate that intravenous novocain effectively relieves the pain of *burns* and provides sufficient analgesia for transportation and dressing. A typical case, reported by him, was as follows: "A patient with numerous small burns due to phosphorus. These were distributed over face, scalp, both hands, left elbow, right leg, and the involved area showed both partial and complete loss of skin. Infusion of novocain, 0.2%, in solution in glucose, 10%, in saline was started on admission. Inspection, cleansing and dressing of burns was commenced 10 minutes later at which time 150 cc. had been given. Cleansing included washing with gauze and some scraping to remove phosphorus particles. There was no pain whatsoever. B.P. and pulse rate remained normal. Total novocain, 1 gm."

In the discussion of his results, Gordon emphasizes the advantages of novocain in combatting the pain, shock and exhaustion which occur in burned patients during transport and dressing, over topically applied analgesic agents whose absorption rates cannot be controlled and which are not effective in an undebrided wound.

In 1945 and 1946, Allen, at the City Hospital in New York City, published reports on the successful use of intravenous novocain in *obstetrics*. By July 1946, a series of thirty-two patients had been delivered under this type of anesthesia. There were no serious accidents.

The drug was given in 1% concentration in 5% glucose solution. The total amount of novocain given ranged from 0.3 to 9.7 grams, over periods of time from 35 minutes to 15 hours. Progress of the delivery was normal. During the greater part of labor a slow infusion kept the pains mild enough to be endured without serious complaint, although they were not entirely abolished. The more severe pain of the terminal stage and the subsequent perineal repair was relieved by rapidly increasing the infusion rate with resultant anesthesia and partial loss of consciousness but without loss of memory. The patients were still able to follow instructions and thus could cooperate by voluntary abdominal pressing.

Thus, during the first part, the concentration was kept low, depending on peripheral action only, and the lesser toxic symptoms of dizziness and mental confusion were avoided. During the second part, markedly higher doses were employed to provide central anesthesia, and subjective symptoms were ignored or quickly passed to attain a state of semi- or complete unconsciousness. Under such conditions, all pain was abolished and although convulsions were feared, they were easily controlled by decreasing the rate of infusion as signs indicated their approach.

In his report on the use of intravenous novocain for the relief of pain in traumatic and inflammatory conditions, Graubard describes its applications to the treatment of such conditions as *fractures*, *post-dislocation arthralgia*, *sprains*, and *traumatic arthritis*. In all of these, pain was relieved and mobility was increased thus permitting a greater range of manipulation. With the dosage used, it was not possible to reduce fractures without some pain. *Lacerations* and *contusions* were relieved of pain and the lacerations could be debrided painlessly. Results in the treatment of *rheumatoid arthritis* were equivocal but those in *osteo-arthritis* were so uniformly satisfactory that he suggests that there may be some specific therapeutic action. He adds, however, that no definite statement can yet be made until a larger series of cases has been treated. Other workers have been successful in treating *morbus coxae senilis* by this method.

Graubard also reports some surprising and unexpectedly good results in the treatment of certain neurological disorders. In *acute anterior poliomyelitis*, symptomatic relief was obtained. There was a gratifying, warm sensation in the extremities, and relief of spasm, as well as increased mobility and improved muscular control. Good results were also obtained in the treatment of *congenital spastics*. There was marked relaxation, increased coordination, increased mobility and use of the extremities, increased speech ability and, surprisingly, increased mental activity.

The French workers have pioneered investigation of applications of intravenous novocain in various *chest conditions* such as asthma, pulmonary embolism, and the anginal syndrome.

In the treatment of acute asthmatic attacks, they reported a greater proportion of successes with intravenous novocain than with any other agent. In some cases of chronic asthma, from three to twelve injections were all that were required to provide relief from attacks and dyspnea for six months. Others required continuously, three injections per week. Over a period of fifty months, forty-one patients were treated with only six complete failures. It is possible that there were some partial failures.

In pulmonary embolism, novocain intravenously relieved the pain, dyspnea, anxiety and sensations of imminent

death in all cases. The treatment was used routinely.

Two cases with angina unrelieved by morphine were treated with intravenous novocain. Relief was obtained immediately.

In the terminal stages of tuberculosis and cancer, intravenous novocain proved to be an excellent palliative for dyspnea and delayed the inevitable use of morphine.

Other workers have reported the successful treatment of serum sickness and of allergic reactions to penicillin, and the relief of post-operative pain by intravenous novocain.

At the Toronto General Hospital, intravenous novocain is used, on an experimentally sound basis, for the control of cardiac arrythmias occurring during general anesthesia, especially with cyclopropane. It has been used successfully to control pain post-operatively and in cases of morbus coxae senilis. It has proven to be a useful general anesthetic and, in combination with pentothal and nitrous oxide, greatly reduces the amount of each anesthetic required. It has not been used in obstetrics.

CONCLUSION

Novocain, administered intravenously, is a drug exhibiting many useful actions. Only a few of these have been studied and explained experimentally, but many have been proven clinically, and many more have been suggested and await future study. The toxicity of the drug has been overrated. In nearly all painful conditions, it has definite value as an analgesic. A future, specific application may be as an anesthetic for old, debilitated and, possibly, fibrillating patients for whom more powerful anesthetics would be undesirable. At present there are no contra-indications for its use in patients with liver diseases. More experimental studies are required to clarify the modes of action of this drug and thus to direct its use in various clinical conditions. In any event, its established uses, today, make it a valuable therapeutic agent.

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CLINICAL ANATOMY OF THE BRONCHOPULMONARY SEGMENTS, PART II

MISS ALLENE I. SCOTT, 4T9

VASCULAR SYSTEM OF THE LUNG

In speaking of this, we must recognize that the lung is supplied by both the greater and lesser circulations. Oxygenated blood is supplied to that part of the respiratory tree not directly functioning in gaseous interchange. This is brought by the bronchial arteries, which arise from the aorta or upper intercostal arteries. They supply the bronchi down to the respiratory bronchioles where they anastomose by the capillary bed with branches of the pulmonary artery. This is the second source of blood. The entire venous drainage is then effected by the pulmonary veins save for the immediate area of the hilum where bronchial veins drain the primary and secondary bronchi into the azygos system.

Here we will consider only the larger divisions of the pulmonary artery. It is important to recognize that the branches of this artery follow the bronchi closely. They too are segmental structures found with the corresponding bronchi in the centre of the segment. However, variations are common and one frequently finds branches ascending or descending, especially posteriorly, to supply parts of segments distant from their points of origin. Because the mode of arterial branching imitates that of the bronchi, the surgeon encountering the artery first can with relative safety, assume that the bronchial pattern will be that seen with the artery.

The major branches of the artery can be readily picked up. Branches to the upper and middle lobe can be found anteriorly in the hilum covered only by the superior pulmonary vein. The entire trunk of the artery, save for its posterior basal branch, may be exposed superficially in the oblique fissure. Because of their positions and the fact that they transport an opaque material, the arteries make up the greater portion of the hilar density in an x-ray, and more peripherally they are represented by the strands seen radiating from the hilum. Thus in cases of pulmonary hypertension, the hilar shadow is larger and denser and the radiating strands are more extensive due to vascular engorgement.

The main trunk of the pulmonary artery arises from the right ventricular infundibulum and is directed in an arch to the left and posteriorly. It lies side by side with the ascending aorta. At a point just below and to the left of the tracheal bifurcation, the trunk divides. Its right branch passes almost horizontally to the right and goes deep to the ascending aorta and superior vena cava, whilst it, in turn, crosses the right main bronchus. At a distance of about one inch from its origin, it begins to branch, giving off first the branch to the right upper lobe, which in turn, divides in a pattern similar to that of the bronchus. The trunk then swings downwards at a 90° angle to its first course, arches anteriorly over the middle and lower lobe bronchi finally to reach a position on the postero-lateral aspect of the basal bronchi. At the beginning of the arch it gives off one or two branches to the middle lobe anteriorly. At the end of the arch, a large branch goes to the dorsal segment, and at varying levels along the convexity of the arch arise so-called posterior ascending arteries to

the posterior segment of the upper lobe. At the level of the basal bronchi, mentioned above, the trunk gives off a branch to the medial basal segment, which has to arch anteriorly over the stem bronchus to reach that segment. A branch to the anterior basal segment comes off antero-laterally and the remaining artery bifurcates into posterior and lateral branches to those segments.

On the left, the pulmonary artery continues the arch begun by the parent trunk and arches over the left main bronchus with the aortic arch medial to it and the origin of the upper lobe bronchus lateral to it. The arch continues to descend to the level of the dorsal lower lobe bronchus. Thus, this arch differs from the one on the right, firstly, in crossing above the main bronchus, and secondly, in descending posterior to the lower lobe bronchus. From the lateral side of the arch arise the arteries to the upper lobe. These usually do not come off as one main stem as on the right but by individual branchings. After giving off the large branch to the dorsal segment, the trunk swings laterally and proceeds to divide as did its counterpart on the right.

In contrast to the arterial distribution, the veins are on intersegmental or interlobar surfaces—thus where fissures are incomplete, one always finds veins in their depths. However, despite the intersegmental distribution peripherally, in the hilum the veins can usually be found near the segments they drain. In addition the veins do not join to form trunks from each lobe as in the case of the arteries, but empty separately into the main veins.

Veins drain the upper and mid-lobes of both sides into their respective superior pulmonary trunks. At the point of junction of all these tributaries, they lie anterior to the main bronchus and the pulmonary artery. The venous trunk is readily located by following the horizontal fissure anteriorly to the hilum. The inferior trunks receive veins draining the lower lobes. These leave the lobe posterior to the bronchus and artery but the trunk swings to a plane anterior to both of these, to enter the left auricle at its infero-posterior angle, opposite to the entry point of the superior trunk. The inferior vein may be found posteriorly or in the pulmonary ligament. Both veins may receive large descending veins from the upper lobe posteriorly. An important variation exists in the occasional discovery of an anomalous drainage of a trunk into some other component of the precardinal or common cardinal system of the embryo. The most frequently found situation is drainage of the right upper lobe veins into the superior vena cava.

CLINICAL APPLICATIONS

Here I want to speak of a group of disorders involving the bronchial tree and segments, whose etiological agents reach the affected lung by way of the respiratory tree. To such a state, Brock has given the name of "bronchial embolism".

Aspirated Foreign Body

The first and simplest case is that of the foreign body aspirated through the mouth or nose. Depending on its size and other characteristics, the body will descend a varying distance through respiratory passages, but in almost every case, the course can be predicted by consideration of the most direct pathway along the bronchi. This course is down the trachea, into the right bronchus, and its lower lobe division and thence into either the posterior or lateral segmental bronchi. Should the foreign body completely occlude one part of this

course, the segments distal to the point of obstruction will become atelectatic and an X-ray picture, on analysis, will indicate the site of lodging of the body by revealing the segments involved.

Aspirated Infected Material

Carrying the concept of bronchial embolism further, we can deal with aspiration of infected materials, such as mucus and vomitus, which may result in a collapse such as is seen in post-operative atelectasis or in a pneumonitis—an aspiration pneumonia. In both these conditions the material has followed the same general course as did the foreign body. There is, however, the further complication that such conditions eventuate usually when the patient is recumbent either on his back or on one side. Thus it is that the material has several new pathways open to it. These we will discuss below under the problem of abscess in the lung.

Lung Abscess

Most investigators today are agreed that the majority of lung abscesses are the result of the aspiration of infected material and are not blood-borne infections. These "bronchial emboli" will naturally tend to travel to those parts of the bronchial tree most accessible to them in the particular position the patient has assumed. Thus with the patient lying on his back, the material will enter most commonly the dorsal bronchus of the lower lobe or the posterior or lateral basal bronchi. The reasons may be readily seen if one recalls the previous discussion of the bronchial tree. Thus the material will pass down the bronchial tree and bypass the upper lobe bronchus, because it ascends at a 90° angle to the stem. Similarly it will bypass the middle lobe bronchus because it arises anteriorly, but it will reach and enter the dorsal bronchus whose mouth opens like a trap door from the posterior aspect of the stem bronchus. Should the material by chance miss this, it will enter the posterior or the lateral branch, because the other two basals arise anteriorly.

By the same reasoning, one may see that with the patient on his side, the aspirated material will more readily enter the upper lobe bronchus and its posterior branch, or occasionally its anterior division, but not the vertically placed apical branch. After entering one of these branches, it will commonly go through its axillary divisions. If it misses this lobe it may enter the middle lobe bronchus (or the lingula) or one of the basal branches. In addition, due to the relative positions of the middle lobe and the dorsal bronchi, there is frequently cross-infection through overflow.

Bronchiectasis

Continuing on to bronchiectasis, which has as etiological agents both obstruction and infection, one finds that the lower lobes are the most frequently involved. On considering the reason for this, one again returns to the pathway followed by a foreign body or aspirated material while the patient is erect. Note then that the dorsal segment is only rarely involved in bronchiectasis unless it be by overflow in a very advanced case. Indeed the dorsal segment which is ordinarily one-third the volume of the lower lobe, may in advanced bronchiectasis expand to comprise over two-thirds of the volume. Mention should also be made of the frequent involvement of the lingula or middle lobe in lower lobe bronchiectasis. This is thought to be due to the direction of the bronchus which readily subjects it to overflow infection.

Pneumonia

Finally we turn to the ordinary infective pneumonia. According to the investigations of Cecil, it has been determined that the bacteria giving rise to the pneumonic process gain access to the parenchyma via the bronchial tree not via the blood stream. Furthermore, the initial process is subpleural in site. As the process gains ground, the primary alveolar inflammation will spread by the pores of Kohn to adjacent alveoli limited in its advance only by the intersegmentary septa. Thus in lieu of the later lobar distribution of the pneumonia, we have an earlier segmental pneumonia. That such is the case is borne out by examination of x-rays taken after an early diagnosis has been made. Apropos of this, it may be suggested that the so-called "central" pneumonia is more likely a segmental pneumonia involving either the dorsal segment of the lower lobe or the anterior segment of the upper lobe, both of which overlie the hilum in an antero-posterior X-ray.

Pulmonary Embolism

This condition may result from the dislodging of an embolus from thrombotic veins in the leg or pelvis or from a mural thrombus in the right side of the heart. These emboli are swept out into the pulmonary artery and a large proportion continue into the left division, because that branch continues in the original direction of flow of the trunk. Once reaching the artery, the emboli depending on their sizes, will lodge at different distances along the artery but the courses they follow will almost always carry them towards the inferior lobe trunk, and more particularly its posterior and lateral divisions, because the other branches arise at more or less acute angles and thereby constitute byways rather than main thoroughfares for the emboli. Thus it is that a large number of pulmonary emboli, if they produce areas of infarction, will do so in areas located in the lateral or posterior segments of the lower lobes.

SUMMARY

1. The general anatomy of the lung outline, including the levels of fissures, is given.

2. The bronchopulmonary segment is defined and located.

3. The outline of the bronchial tree and of the vasculature, in relation to the bronchial segment is given.

4. The concept of bronchial embolism is set forth and applied to several clinical conditions.

5. Finally pulmonary embolism is discussed from the viewpoint of sites of infarction.

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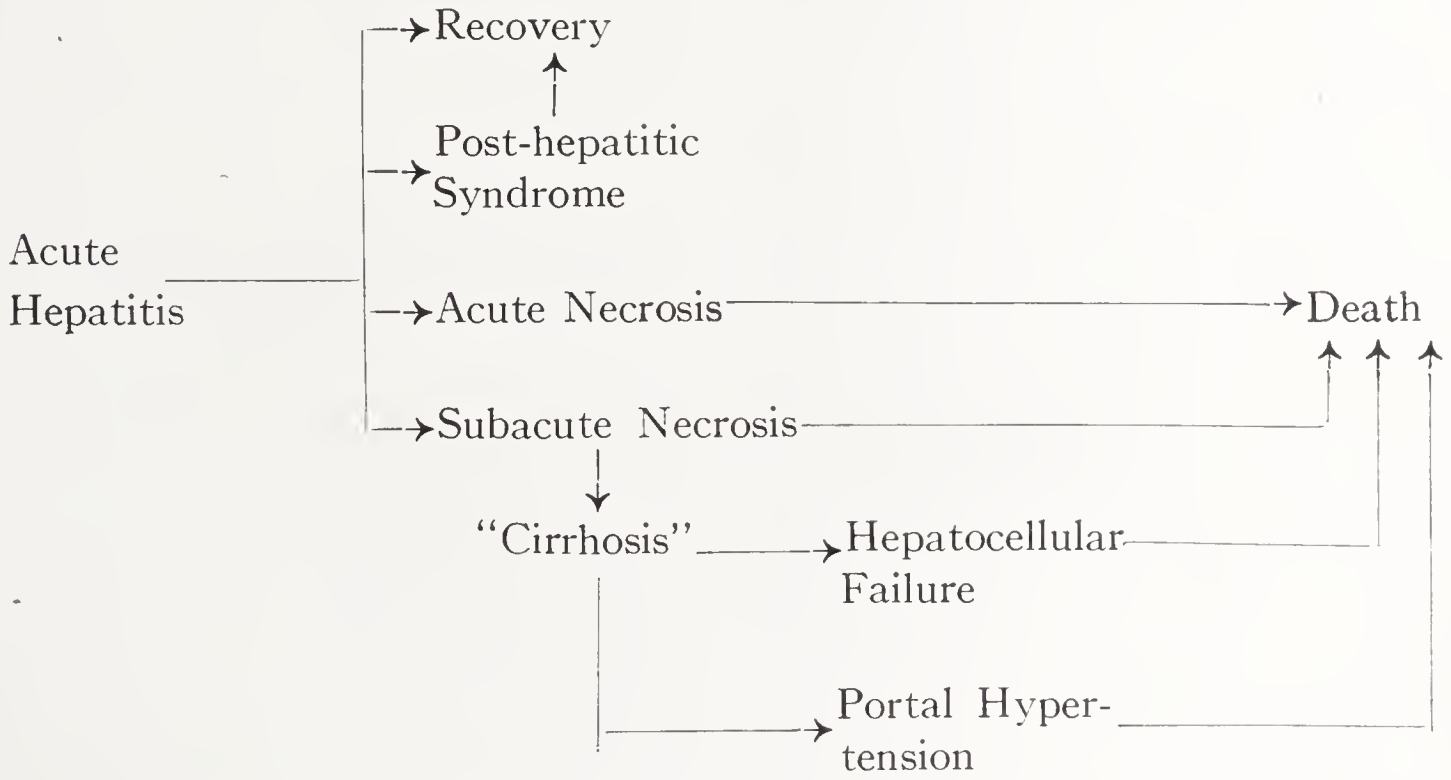
SPECIAL LECTURES

STUDIES OF INFECTIOUS HEPATITIS BY LIVER BIOPSY[1]

As recently as 1942, some centres[2] still accepted Vichow's theory regarding the etiology of epidemic (infectious) hepatitis. He believed that this disease was due to a mucous plug in the ampulla of Vater and an ascending, cholangitic infection of the liver, whence the name "catarrhal jaundice." The number of dissenters had been growing, however, and as early as 1918, Eppinger had described two cases showing diffuse hepatic necrosis at autopsy.



With the introduction of the technique of liver biopsy by Danish workers, it was found that the various forms of sporadic, epidemic, serum, and post-transfusion jaundices all presented the same pathological picture—hepatocellular necrosis with a marked leucocytic reaction. Two types were recognized: (1) Diffuse, with uniform involvement of all parts of the liver lobule, and (2) Zonal, with maximum necrosis around the central vein and the leucocytic reaction confined largely to the portal areas. The inflammation begins in the pre-icteric stage and is probably maximal before clinical jaundice appears.

Regeneration occurs from without inwards so that the area of the lobule surrounding the central vein is the last to be restored. The remarkable regenerative power of the liver parenchyma was shown by a comparison of biopsies of the same patient made during the height of his disease and then six months later. Severe hepatocellular necrosis with only afew cells surviving within the lobule had been followed by complete restoration of the lobule along normal anatomical lines. The reticular framework between the parenchymal cells had remained

[1]Summary of a lecture by Dr. Sheila Sherlock to the Fourth Medical Year, October 6, 1948.

[2]The obstruction by mucous plug theory was given up by the Toronto School more than twenty years ago. The disease called "catarrhal jaundice" was considered to be an acute infection of the liver.

intact and had provided "tramways" to guide this orderly proliferation of liver cells. In cases where this reticulum is destroyed by the disease process, regeneration is disorderly, the normal anatomical architecture is lost and scarring is inevitable. That this result represents cirrhosis is unquestionable, but the relation of post-hepatitic cirrhosis to classical portal cirrhosis is still unsettled.

The possible courses which a case of infectious hepatitis can follow are summarized in the diagram on page 57: Treatment does not influence the outcome except that early ambulation seems to predispose to relapses. Recovery is the rule in more than 99.8% of cases. The post-hepatitic syndrome includes anorexia and fatty dyspepsia. Usually, it improves spontaneously within eighteen months and is of little clinical significance. Acute fulminating necrosis (acute yellow atrophy) is usually fatal within ten days. Death due to subacute necrosis most often occurs within three or four months. "Cirrhosis" following the subacute form and resulting from destruction of the reticular network may ultimately progress to either (1) hepatocullular failure which is rarely seen in this type of cirrhosis or (2) portal hypertension which is the great danger of post-hepatitic cirrhosis because of the risk of fatal hemorrhage.

C. Ezrin

VENOUS PRESSURE AND THE EFFECTS OF DRUGS USED IN TREATING HEART FAILURE†

Starling's law of the heart states that: "The energy of the cardiac contraction is a simple function of the length of the muscle fibres of the ventricle at the end of diastole." This means that the venous inflow and, therefore, the venous pressure, determine the cardiac output by affecting the length of the myocardial fibres at the end of diastole. However, Starling also found that there was a physiological limit to this increase in cardiac output with an increase in venous pressure. If the venous pressure and, consequently, the diastolic length of the myocardial fibers exceed this limit, the cardiac output is reduced.

For his experiments, McMichael effected a reduction in the venous pressure by putting pressure cuffs around the four limbs and inflating them to prevent venous return—a "bloodless venesection." With a normal heart, reduction in the venous pressure by this method produced a decrease in the cardiac output in accord with Starling's law. With a failing heart, however, reduction in venous pressure was accompanied by an increase in the cardiac output. This observation is readily explained if it is postulated that before the reduction in venous pressure, the failing heart had been functioning, in effect, at a point beyond the physiological limit described by Starling.

The beneficial effect of a reduction in venous pressure in heart failure having been established by these experiments, McMichael undertook an investigation of the effects of some of the various drugs used in the treatment of heart failure. The following is a summary of his results and conclusions.

†Summary of a lecture by Prof. John McMichael to the Fourth Medical Year, October 7, 1948.

The effect of **mersalyl** (as an example of a mercurial diuretic) is due to the reduction in blood volume and, therefore, in venous pressure, following diuresis. Mechanical reduction of the venous pressure by "bloodless venesection" gave a comparable elevation in the cardiac output.

In addition to its diuretic effect, **theophylline,** apparently, has a direct stimulating action, like adrenalin, upon the myocardium which is demonstrable in both the normal and the failing heart. The increased cardiac output produced by this drug could not be duplicated by a reduction in the venous pressure alone.

In normal individuals, **digitalis** lowers the venous pressure and the cardiac output. It is concluded, therefore, that digitalis does not stimulate the normal heart but acts upon venous tone to reduce the venous pressure. In the failing heart, digitalis reduces the venous pressure and increases the cardiac output. Is this latter effect due to a direct stimulation of the cardiac muscle or to a decrease in the venous pressure? To answer this question, the purified glycoside, **digoxin** was studied and found to produce almost the same effects in congestive failure as does venesection. This suggests that reduction of the venous pressure is the primary effect of digoxin. After venesection, however, the arterial pressure falls, whereas after the administration of digoxin, the arterial pressure remains unchanged or increases. It is probable, therefore, that digoxin has some stimulating action on the failing heart which would explain the changes in arterial pressure.

There has been a tendency to group **strophanthus** and **ouabain** with the digitalis glycosides because of supposedly identical pharmacological actions. Certain European schools, however, have stressed the more powerful action of these two drugs as compared with that of the digitalis group; and have recommended that strophanthus be administered to patients failing further to respond to digitalis. This difference has been verified by investigations during the past year. Their action was found to be independent of venous pressure changes. Strophanthus and ouabain have a directly stimulating effect on the failing myocardium which is stronger, more immediate, and more easily measured than that of digitalis. It is accompanied by arterial hypertension and an immediate increase in cardiac work of one hundred percent. This effect is not obtained in normal subjects.

C. Ezrin

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EDITORIAL

HUMANISM AND MEDICINE

A consideration of the great Eastern and Western civilizations, their histories of progression and regression, their concepts and ideals, their philosophies and beliefs, and their arts and sciences, shows clearly that men move forward together in all branches of learning and creative effort, and that such progress is impossible unless the cultural and social "climate" is favorable for the growth of their curiosity, their ideas and their ideals. Every man must be free to reflect upon, and to teach, his beliefs in relation to himself, to his fellow men, to Nature, and to his God. Out of the best of such reflections and teachings has grown the great tradition of humanism and education in Western civilization based on science, philosophy and an appreciation of esthetic and spiritual values.

"Man has accomplished half his task; he has wrested enough of Nature's secrets from her to give the material basis of a high civilization to every country in the world; to provide not only the necessities but the comforts of life to the whole of the world's teeming population. The other—and the more difficult—half remains; that of controlling his own human relationships, and directing his own activities so that they are not mutually destructive." (Salter).

Medicine requires that its practitioners be educated not only in the science but also in the art of medical practice. No physician can become accomplished in this most difficult art unless he has a kindly, friendly feeling for all peoples. This calls for humanism which is so necessary for a complete understanding between physician and patient. "By

the neglect of the studies of the humanities, which has been far too general, the profession loses a very precious quality." (Osler). "Science, the fruit of man's pre-occupation with Nature, must give way to Humanism, the flower of man's experience with man." (Gregg). Science becomes human through the friendliness and the human touch of great teachers and great physicians. Without this element in medicine, as in life, the character of our age would be coldly material and mechanical.

Thus, medicine must be more than an expression of science, instinct for learning, curiosity and imagination. It must be infused with humanism. A humanistic background is absolutely essential to balanced training and perspective in medical practice. In consideration of this, Allen recently wrote: "It seems clear that the need is to bring premedical and medical curricula up to date by recognizing the obvious fact that medicine has outgrown the limitations of the laboratory and clinic and must add to itself *as required studies* pertinent phases of the disciplines of the social sciences and the humanities. . . . surely there is room . . . for satisfactory orientation and discipline in such important basic medical sciences as psychology (including especially social psychology), sociology (including social history), and the rudiments of humanistic philosophy and logic. Surely, too, with regard to the humanities, there is time for a premedical student to acquire a taste for great English literature and, if possible, familiarity with some foreign language."

Such a program of education is already in progress in our Faculty of Medicine. In the premedical years, the student can study subjects from the humanities without any distraction of concurrent medical courses. He should apply himself seriously to the subjects he selects and never lose sight of their fundamental importance in his general education and in his development of discrimination, judgement and self-expression. They help to correct the fact that, usually, he "comes to the university litterate, but unlettered; at best he is avid for facts, but he has little or no interest in ideas." (Wasteneys). They amplify and broaden his general education, and, therefore, better prepare him for the practice of medicine. They provide him with the breadth of outlook, the comprehensiveness of interests, and the ability to express himself in a clear, simple and convincing manner, which will enable him intelligently to become a valuable member of the community in which he will practice.

A further outstanding advance in medical education is the introduction of the course, "Humanistic and Scientific Values in Medicine," into the curriculum of the Second Medical Year at our University. This unique course is being received with great enthusiasm, and, therefore, it is with real pleasure that, commencing in this number of the JOURNAL, we will present a series of articles entitled "Humanism And Medicine" which are being prepared by Dr. H. B. VanWyck from the substance of his lectures in that course.

SPECIAL LECTURES

Recently, the students in the Fourth Medical Year had the privilege of hearing lectures by Dr. Sheila Sherlock and Prof. John McMichael of the British Post-Graduate Medical School. Summaries of their lectures were prepared by one of the Assistant Editors and are presented on pages 57 and 58.

HUMANISM AND MEDICINE

H. B. VAN WYCK[1]

FOREWORD

THIS SERIES of articles will contain the substance of lectures delivered to the under-graduates in the Second Medical Year. These purport to be a discussion of the history of medicine in relation to the development of science and humanism in general. Before beginning the historical treatment of the subject, it seemed necessary, in Part I, to define one's terms, explain one's point of view, and, without detracting from the attempt to remain impartial and objective, to reveal one's general attitude to some of the great problems of life—a revelation rather to forestall than to admit the charge of prejudice. In Part II, further elucidation of the place in space and time of both writer and reader as observers of the recorded facts is attempted; following which the conventional order in the description of the development of medicine will be followed. One diversion, at least, from the conventional treatment will be attempted; inasmuch as little space will be given to the errors of superstition and fallacious logic; at least to those whose perpetuation was fruitless in the advance of science. Gold is not only more precious than chaff, but holds more interest, and in the records of the past there is much chaff. The thread sought and followed in these pages will be golden, or at least of specious gilt.

PART I

HUMANISM AND SCIENCE

THE CONTRAST between the world of physical science and the humanistic realm of values has been the object of contemplation since the first human being began to wonder at the cause, purpose, and destiny of his existence. In terms of a cosmic scale of time, this first primitive questioner might claim to be the father of modern thought; and, though thousands of generations of man have followed his wake in quest of knowledge of these mysteries, the truth, the meaning, the values in the universe remain an El Dorado, a goal of exploration, a partially discovered bourn whose fringes only have been reached by human endeavor. When prehistoric man found a method by which he could plant and protect a fruitful seed and measure his return in a more bounteous harvest, he became a pioneer of science; when a tribe in dim antiquity assembled to hear the first tale of selfless and fruitless heroism, thrilled to the beauty of sacrificial love, they became the vanguard of humanism. The apposition of the science of nature to humanism does not represent an irreconcilable antinomy—each is a facet of human experience; the boundaries of each override the other, and both are mutually interdependent.

Natural or physical science is man's brilliant but far from complete achievement in discovering the nature of the phenomenal world through the tech-

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niques provided by physics, chemistry and their handmaiden, mathematics. From such are given measurements, pointer readings of the material world; and, useful and accurate as these may be, there is little reason to believe that the nature of ultimate reality is to be fully reached by these means. The world of science is not concerned with values and use is only a secondary end. To the philosopher, if science is right, the external world is stripped of its qualities and what is really out there are "electrical charges." This disillusioning view follows from Locke's "Essay on the Human Understanding" and its implications are unfolded by the greatest of contemporary thinkers in a memorable passage: "Thus nature gets credit which should be in truth reserved for ourselves; the rose for its scent; the nightingale for his song; the sun for his radiance. The poets are entirely mistaken. They should address their lyrics to themselves, and should turn them in odes of self-congratulation on the excellence of the human mind. Nature is a dull affair, soundless, scentless, colourless; merely the hurrying of material, endlessly, meaninglessly."[2]

Thus the scientific world becomes eviscerated of sensible qualities; it is stripped of its values. Goodness, beauty, holiness, justice may be searched for in vain in its archives. Such a world, uninterpreted by humanism, because it neither reveals nor justifies the ethical, artistic, or religious aspirations of man, is a drab blotch on the unintelligible canvas of a meaningless universe without value.

Yet in such a universe there is no stage to produce a Beethoven, a Shakespeare, a Michael Angelo, or a Christ, whose acclaim testify to the values placed by humanity on poetry, ethics, art and religion. These have no roots in the scientific view of the world; they find their affirmation in human experience; and independently of science, they constitute a non-material, but nonetheless sturdy and undeniable reality whose attestation is humanism.

Thus the problem of education has and will ever be the fine balance of science and humanism—both are essential to what is best defined as a "liberal" education—a term that early in classical Greco-Roman times came to mean an education worthy of a free man. The bifurcation of paedogogic aim involved in the differentiation of science and the humanities was perhaps first apprehended by the Greeks of the "Great Age"; and the shrewd observation of Aristotle that, for the youth, able to grasp the concrete data of science before being mature enough to perceive the values of ethics, philosophy and history, the early study of these subjects laid a groundwork of training which would with greater experience of life, ultimately bring a richer understanding and wisdom.[3]

Thus did one of the richest and most comprehensive geniuses that ever appeared stress the importance of humanism in education. During the dark ages with the eclipse of science and the subsequent development of scholasticism, the humanities (litterae humaniores) were contrasted with and made subordinate to "divinitas" and for the centuries of the Renaissance the term "humanitas" was used to include only secular learning. To the scholars of the period before the resurgence of interest in natural science, humanism came to mean a salvaging of the learning of the past largely by means of Greek and .Latin literature; but,

[2]Whitehead, A. N.: Science In The Modern World, pg. 68.

[3]Aristotle: Ethics, Nic. VI, 86.

uagradlly reflected more and more human aspirations and human problems for life in this world. With the increasingly greater place that science has come to occupy in the curricula of modern education, the humanities may now be defined as those realms of human inquiry whose concern is the personality of man. And today, humanism may well include religion as well as the so-called secular branches of humanistic interest.

In our time, the balance has swung in education from a too absorbing interest in the literature and philosophy of the past to the other extreme; in which education has been saturated by the growth of the physical sciences to the subversion of the humanities.

Credulous humanity has been always too ready to believe that the study of natural science tends to leave all doubt behind. They forget too easily that today's science is often tomorrow's superstition. Many a scientific paper written only a few years ago would make its author blush if he had to read it now to his contemporaries. "Science sheds its conclusions as readily as a snake its skin."[4] The physical sciences have given us much that is useful; but can they guide us to what matters most? Since when have the physical sciences thrown convincing light on the relation of mind and body, on justice and liberty, ethics and conduct, international relations, moral and esthetic values, will and destiny? The spellbinder of the laboratory is silent. These are admittedly difficult problems. We might be content with less—with a physico-chemical analysis of Hamlet or a recipe for its creation; with the formula for the murals on the Sistine Chapel, the frieze on the Parthenon or the fairy loveliness of the "Unfinished Symphony." If for these, we know no appeal but to science, we remain with empty hands.

Even in science's special realm, the interpretation of the phenomenal world, how easily do man's erratic senses betray him. If we place santonin in our eyes, we see everything yellow. Because we cannot believe that our changed vision has altered what we think we perceive, we must conclude that the appearance of yellow is produced by our visual apparatus. The modern observer realizes that most of what physical science tells us of our world is ultimately reduced to mathematical symbols of particles in motion and to the eye of that science there is no remainder. Hence must we seek the explanation of the intimations and affirmations of our ethical, religious and artistic consciousness elsewhere in the depths of man's experience of which humanism alone unwraps the scrolls. Science, because of its restricted technique and scope can give us only a part of experience, and its perceptive presuppositions have no more right to be treated as objectively valid than the concepts of values in the souls and minds of men where science may probe in vain.

That the valueless realms of pure science would prove to be an insufficient pabulum for the nurture of personality if spiritual values were to survive, has been the burden of much dire prophesy. The fallacy that consists in basing an estimate of man's welfare on the degree to which his material surroundings are capable of improvement had its clearest and most enthusiastic announcement in the *New Atlantis* of Bacon at a time when the scientific method had its rebirth with the revival of learning. The assumption that man would be both happy and wise as he perfected his mechanical environment;

[4]W. M. Dixon: The Human Situation, pg. 56. This paragraph is paraphrased from this reference where the argument is developed in a passage of great beauty and power.

that his welfare depended on the ingenuity of his machinery; that his control of the material world would bring contentment and satisfy his deepest aspirations has proved a fallacy obvious now even to the most naive materialist. Science has brought the promised increase in power, but man, failing to keep pace in the evolution of spiritual and moral development, finds that his triumph is empty and his dreams of Utopia change to visions of horror and despair. The thoughtful modern man brought to the brink of the abyss of annihilation by a science unchecked by the reins of humanistic thought, must now perforce heed the voices from the wilderness that have never ceased to echo down the centuries. The way of repentance is the abandonment of materialism and a renewal of the zest to seek among the temporal deceits of external nature the road to that invisible realm of reality—a moral universe. No generation of man since the rise of civilization has lacked prophets to point the trail. The honour roll of those who have recalled man from the idolatry of matter and have pointed to the meaning, purpose and design of the universe, contains among the immortals countless humbler folk whose thoughts and lives were based on the higher concepts of the spirit. Of these, the voices are stilled; but, heard once again with greater clarity because of the shadow of futility and terror across the path ahead, are the words of Plato, inspired to find beyond the visible but transitory world of sensation which his instinct distrusted, the unseen ideal; of Socrates, who looked within the soul for the values of life and two thousand years ago rebuked the modern psychologist so pre-occupied with seeking the causes of human behaviour by external observation, that he is blind to its purposes and values; of the Nazarene who asked what profiteth a man if he gain the whole world and lose his own soul; of Erasmus whose tortured cry rings out across time as if uttered yesterday: "See what the world is coming to—rapine, murder, plague, famine, rebellion, no one trying to mend his own life."

To none of these seers was the peril of a society such as ours enmeshed in the web of scientific technology a matter of experience, but to such is truth revealed in prophetic vision whose radiance reaches the infinite recesses of human personality.

To the Elijahs and Cassandras in human history, the masses of men and most of their leaders turn ears deafened by preoccupation with a universe they understand only in terms material and ephemeral. The fate of Israel and the Fall of Troy were but local, if expensive, vindications of their wisdom. The redemption of man's folly may well come from many sources, among which education, while far from a complete means of salvation, provides at least a practicable and essential stream of influence. To the school and university, with their adjuvants the press and the modern radio, the progress of science and its effect on social life and the individual provide their major problem. Humanism with its accumulation of the thoughts of mankind must continue to occupy a larger part in education. It must temper technological training, which, unleavened by the determination of ends rather than means, of values rather than prices, in brief without the savour that alone can transform a dark materialism into a habitat worthy of the indomitable spirit of man is no education at all—merely a formula for a sterile, monotonous, and wholly purposeless existence. The resolution of this dichotomy in our educational systems, due to the disastrous separation of humanism and science needs achieve-

ment at once; for this reconciliation between two points of view mutually necessary to the continued existence and happiness of mankind, the time is fast running out. The prophets have spoken through the centuries to little purpose. Their message apparently required amplification and this has come in dramatic terms intelligible to the most heedless. No mere local Trojan tragedy this. The stage was Hiroshima, the actors were tens of thousands of innocent victims, the holocaust provided the lurid lighting of the tragedy, and the roar of disintegrating atomic worlds was an overture—the march of infernal fate and the presage of annihilation of man himself.

Education is the most effective, perhaps the only ultimate solution of man's present plight. Too often is the curriculum of the natural sciences a guide only to a living, to a technique. Uncritical devotion to science fosters a deterministic and materialistic concept of our universe without the meaning that only the concepts of the values can give. Such a concept of a world without moral purpose finds a congenial abode in totalitarian and despotic states. For this unbalanced view of life, the antidote must be found in the humanities—philosophy which seeks to interpret the concrete by the abstract, the apparent by the real, the transitory by the eternal; history which records the reaction of the race to the experience of life; literature which preserves man's highest aspirations and reveals to his own fascinated gaze his potentialities for good and evil; music and the arts which justify his creation and give promise of high destiny; and religion which binds these nobler concepts into the acceptance of a universe of values, a moral universe, and thus defines a way of life that has meaning. Thus, the humanities promise much more than a mere living. They promise life, wisdom, a spiritual concept of existence, freedom of intellect and will, and the fruitful development of man's ineradicable religious instinct.

These two fields of education must find integration. How to combine the accuracy, exhilaration and technical power of the physical sciences with a breadth of vision and sympathy with humanity—is the task. To perceive the task is to begin its completion. Successful integration has at times been achieved, and perhaps the best example has been found in the profession of the art and science of medicine. A long tradition of service provides a proud heritage for its present exponents—service based on technology tempered by human wisdom and understanding.

It may be fanciful to suggest that the concept of the artist as one who has acquired, by discipline and training, the appropriate technique and breadth of experience illuminated by humanism, and who is now equipped to give creative expression to his work, is the formula by which education can give the needful direction to human kind. Perhaps the art and science of medicine, of which the tradition implies that, in its ideal, technical skill and compassion in even balance, are brought to the bedside, may point the way. Even as the true artist is creative, so is the physician whenever he, with a complete equipment of material and spiritual resource, establishes with his patient that unique individual relationship which is the most precious of his achievements. If education can succeed in dignifying all tasks however lowly by an integration of technique and wisdom, by stimulating each worker, however humble, with the artistic vision of creation, it will be because the balance between science and humanism has been corrected. To quote Rabelais—"Science without conscience is the death of the soul".

PART II

ORIENTATION OF PRESENT DAY WESTERN MAN

As LENAN remarked, "Pour comprendre les choses, il faut examiner les origines." To understand the present status of human thought and inquiry in its myriad undertakings, the record from the beginning is an essential study. The reading of the scroll of the evolution of human intellectual progress is perhaps more essential to the humanist than the scientist; but failure to unroll it deprives the latter of impetus and direction and the former of tolerance and vision. To ignorance of the past and indifference to its legend is born blind formulism.

The practitioner of the healing art is uniquely dependent on acquiring both the scientific and the humanistic point of view. His daily life is lived in a milieu demanding the objective knowledge and application, of the principles of science and the more subjective appreciation of human values. Without those principles, he falls into an unforgiveable charlatanism which no pietistic or sociological equipment might redeem; without that appreciation, the knowledge of his craft is bereft of valid purpose and the practice of his art, of human understanding. Fortunate indeed is he, that the sciences among which he has his being, and they alone, have as yet not been dedicated to destruction; and happy the physician who finds a moral joy in the altruistic service he may render if his guardianship of the spirit is as real as his therapy of the body.

The ideal of a liberal education for the physician is manifest; but he suffers as do all those, the technique of whose work demands many years of wageless training, from the all but insoluble difficulty of receiving a liberal education while at the same time he pursues his specialized and scientific study.

The university curriculum and atmosphere may attempt with a modicum of success to supply the elements which are often lacking; but, because of the time and expense involved, far from a complete solution of the problem is provided within academic walls. The truth is that education in the humanistic point of view can be only begun in school; and the university may only point the way; but the wise student whose feet have been set on the delectable journey into the realm of man's scientific and humanistic achievement will continue his progress and remain a student throughout his life. The beginning of comprehension of the world about us is historical and political orientation; in simpler words—where is the modern Canadian observer in relation to time and place?

The corridor to the past through which man may direct his vision reaches back to the beginning of life, twelve hundred million years ago, and past again beyond that for a stretch of similar length to the beginning of the universe itself—a nebular beginning without differentiation of matter and therefore without even the promise of its organic goal. The age of the universe was perhaps one thousand million years before life appeared; and, in the twelve hundred million years that have elapsed since the first living organism became the first organic chemistry laboratory, life has evolved to its present forms. Human life appeared approximately one million years ago, but the upward climb of culture did not reach the stage of civilization until about 4,000 B.C. Looking to the future, the physicist may assure us that the world will be habitable for another 1,200,000,000,000 years

before the second law of thermodynamics has produced a dead universe—unless indeed the foolish artifice of mankind has anticipated the natural event by atomic warfare. These astronomical figures become more intelligible when reduced in scale.

The million years of man's past do not seem such a long span when compared with his future which may be more than a million times longer; and, in this span of cosmic time, the 6,000 years that man has experimented with civilization should not strain unduly the patience of the Utopian idealist. As Sir James Jeans has put it: "As a being destined to live for three score years and ten, humanity, although it has been born in a house 70 years old, is in itself only 3 days old. But only in the last few minutes has it been conscious". Objective reflection on this time relation should keep our idealist from undiscerning surprise that man has not discovered all the truth about the universe or has not evolved to his highest moral or spiritual capacity.

For political orientation, in terms of modern, western man's relation to the progress of civilization, he must divest himself of the limitations of a national framework and think of himself a member of an entire civilization or society. We, in Canada, belong to Western civilization, but the significance of such a platitudinous statement is not revealed by the search for the conventional definitions of civilization. These may determine the quality of the entity, but leave undisclosed its modern actuality. H. G. Wells[5] would define civilization as "the settlement of men upon an area continuously cultivated and possessed, who live in buildings continuously inhabited with a common rule and a common city or citadel;"—surely here is the body without the soul of civilization. Clive Bell, in his brilliant monograph[6] defines "the first step towards civilization as the correcting of instinct by reason." "Social order promoting cultural creation with limitation of chaos and insecurity" is the contribution of a popular writer on philosophy.[7] Such formulae focus little light on our claim to be a part of a particular civilization; what is sought is the concept of the individual organic unit we term Western Society.

The greatest historians through the ages have told their story with a constant awareness of units larger than the isolated city state or nation; and the depiction of empires on the tapestry of history has always involved a breadth of treatment by which parochial divisions are reduced from a national to a tribal scale. It remained however for the German philosophers of the past century to find in national groups the lineaments of an evolving organic structure with phenomena analgous to a biological entity; and Spengler's *Decline of the West*, which appeared in 1918 exemplified the most elaborate attempt as yet to subject this view of civilization to scientific analysis. That civilizations like plants exhibits genesis, youth, maturity, and senescence; and, as in plants, that these stages reveal the same symptoms and are inevitable was Spengler's thesis. That grandiose hypothesis however was vitiated by a deductive approach and distortion of fact, a fault in the magnum opus which Spengler's monumental erudition could

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[5]H. G. Wells: "The Outline of History," vol. I, page 184.
[6]Clive Bell: "Civilization,", page 162.
[7]Will Durant: "The Story of Civilization," vol. I, page 1.

not redeem. A much more scientific and significant exposition of such historical synthesis has appeared in our time. In *A Study of History*, Toynbee defines a civilization as the smallest intelligible unit of historical study. If one examined English history, for example, one finds that the chapters of England's story are chapters of the history of some society of which Great Britain is only a part "and the experiences were experiences in which other nations besides Great Britain were participants."[8]

He identifies the society or civilization to which England belongs as Western Christendom. "Substantially" on the cultural plane "it is confined to the countries occupied by Catholic and Protestant peoples in Western Europe, America and the South Seas."[9]

Toynbee finds five contemporaneous civilizations—our own Western society, The Eastern Orthodox Christian Society, Islam, the Hindu Society, and the Far Eastern. In the examination of the origins, he finds that both Western Society and the Orthodox Christian Society are "affiliated" to or derived from "Hellenic Society" by which Toynbee designates the Graeco-Roman world.

The development of Toynbee's concept of civilization is an opportune contribution to modern political thought. It supports the view that we of Western Europe and the Americas belong to a brotherhood of nations with a common heritage of science and humanism; that wars within this society have been fratricidal and that our heritage, well worth preservation, may be saved only by union of all western Christendom.

Such has been the dream of many great European thinkers from St. Augustine, Erasmus, Matthew Arnold down to our greatest contemporary Winston Churchill, the latter occupying a lonely isolation as few statesmen of power and good will seem to have caught the gleam. Those who have seized the sword to accomplish it include a ruthless Corsican bandit and a discredited Austrian paperhanger, and often has Pan-Europeanism perished by the sword. Our survival depends on the unity of Western Christendom, union to preserve the meaning of certain words, a meaning which our society in spite of the inroads of alien ideologies still hold in no uncertain understanding — Justice, Mercy, Freedom and Truth — ideas that came into being in ancient Palestine or Greece.

Such is our present political orientation as we trace the origin and growth of our civilization in the following chapters.

The world that we of Western Society inhabit, while it can not be treated in isolation from the contemporary civilizations in the Far East and India, and still less so from the Russo-Byzantine Eastern Christendom and Islam, finds predominantly its primary roots in the cultural and scientific streams of influence that have come down the ages to us from the Graeco-Roman world — from Athens, Palestine and Rome.

To unroll the development of Science and humanistic thought, it would be defensible to begin before the dawn of recorded history and describe the first discovery of fire, abstract thought, the use of mathematical symbols, the first written word, the wheel, the first tool, the first diplomatic tribunal union. These occurred in the countless millenia of pre-historic ages and the futile

[8]A. J. Toynbee: "A Study of History." Oxford University Press 1946. Page 3.
[9]Op. Cit. page 7.

attempt to replace the absent annals by an imaginative reconstruction ignores the paucity of facts and must offer an unconvincing fiction based only on unsupported assumptions. Where the drama of civilized man first becomes realistic, and the opening curtain may be lifted on scenes that bear the stamp of historicity, is marked the point at which modern, Western man can watch with fascinated gaze, the unfolding of his forefathers progress towards the present, in the clear lighting of historical documents. The place and time of this first act may well be chosen as Greece in the fifth and fourth centuries B.C.—with a brief prologue of certain events that took place in the valleys of the Euphrates, the Tigris and the Nile.

To concentrate on the events in the Near East and the Mediterranean basin might incur the charge of provincialism of viewpoint if one ignored the fact that significant happenings were occurring elsewhere in the world; these however were too remote to affect the peoples of our parent civilizations and not for centuries did the impact of the West and the Far East produce effective interaction. For the purpose of this survey—the parallel development of scientific and humanistic thought and the science of medicine—one may well begin at the Prologue to the great age of Greece—the valley civilizations of Mesopotamia and the Nile.

(*to be continued*)

ABSTRACTS

BACTERIOLOGY

Therapeutic Activity of Bacitracin in Rabbit Syphilis and Its Synergistic Action with Pencillin. Eagle and Fleischman: Proc. Soc. Exp. Biol. Med. **62**, 415-417 (June 1948).

Bacitracin is an antibiotic substance derived from culture filtrates of certain strains of *B. subtilis*. It has a low renal clearance approximating the glomerular filtration rate, in contrast to penicillin with a renal clearance approximating the total renal plasma flow. As a result, it is excreted more slowly and the blood level falls more slowly after injection.

It has been shown, *in vitro*, to be active against *Tr. pallida* in blood at a concentration of 0.1 unit per cc. It kills 99.9% of the spirochaetes in 48 hours. Large single doses are effective for the permanent healing of a primary lesion *in vivo*.

This article reports on the therapeutic activity of aqueous solution of bacitracin after intramuscular injection on four successive days. Data is given which suggests a remarkable synergistic action between penicillin and bacitracin. It is possible that in the treatment of human syphilis also, the synergistic action of the two drugs may permit a significant reduction in dosage and perhaps a significant decrease in the minimum time necessary for cure.

D. E. Yates

BIOCHEMISTRY

Plasma Inorganic Iodide as a Homeostatic Regulator of Thyroid Function. J. Wolff and I. L. Chaikoff: J. Biol. Chem. **174**, 555-564 (June, 1948).

Enzymatic conversion of iodide to thyroxine and diiodotyrosine by the thyroid gland is controlled by the level of plasma inorganic iodine. Five levels of iodine administration ranging from 10-500 gammas of I^{131} were studied in rats. Radioactivity served as a measure of the amounts of injected I^{127} that entered the gland. With the exception of the 10 gamma dose, the amounts injected greatly exceeded the iodine contents of the thyroids of the rats. Results were obtained as to the amounts of inorganic and organic or bound iodine in the thyroid glands at successive intervals of time after administration.

From the observations it was concluded that the activity of the normal thyroid gland *in situ* is inhibited in the presence of excessive concentrations of inorganic iodide. Organic binding of newly accumulated iodine began to occur when plasma iodide concentration fell below the range of 20-35 gamma per cent. During the period when the gland's capacity to bind iodine is blocked, the gland does not lose its ability to concentrate iodine. Concentrations of inorganic iodine found in the blocked gland were roughly 100-300 times those in the plasma.

It is plausible to assume that the level of plasma iodine is part of a homeostatic mechanism governing hormone synthesis in the gland. This mechanism can help explain why the administration of large amounts of iodine in Grave's disease is beneficial.

Miss S. Ramcharan

MEDICINE

Carcinoma of the Oesophagus: A Clinico-Pathological Study. R. W. Raven: Br. J. Surg. **36**, 70-73 (July, 1948).

A study has been made of 277 cases of carcinoma of the oesophagus comprising 216 males and 61 females. Only 40% of these patients reported within three months of the onset of symptoms, which ranged from abnormal sensations on swallowing and mild dysphagia to occasional vomiting or regurgitation of food. 45% of the patients were in the age group 61-70 and presented the usual problems of treatment in the aged. The middle third of the oesophagus accounted for 47% and the lower third for 29.2% of the cases. 61% proved to be squamous cell carcinoma on section. Metastases occurred in 57.4% of cases in the following sites: lymph nodes 33%; liver 26%; lung 16%; adrenal gland 12% with 13% in other locations. The usual indications for surgery apply, contraindications being the presence of metastases and/or severe cachexia. It is important to note that 42.5% of patients at autopsy showed no metastases. Surgical excision is urged for all suitable cases and at operation lymph nodes and liver should be examined for possible metastases, as well as palpation of the lesion to determine the presence and extent of submucous spread beyond the edge of the obvious carcinoma. Allowance must be

made for this spread during high voltage irradiation. Spread to the thoracic aorta or hilum of the lung renders the neoplasm inoperable.

T. A. McLennan

Effects Of Shock On The Kidney. D. D. VanSlyke: Ann. Int. Med. **28**, 701 (Apr. 1948).

Van Slyke discusses shock resulting from hemorrhage, burns, trauma, dehydration or other injury in which there is an inadequate volume of blood to fill the vascular bed. Visible signs include prostration, cold sweating and bloodless or cyanotic skin. An immediate effect of shock is a decrease in renal blood flow and in renal function which may lead to complete anuria. This is followed by a compensatory constriction of nonrenal peripheral vessels and if the loss of circulating blood volume has not been too great, renal blood flow and function may be restored rapidly. However, in severe shock, the renal vessels are included in the peripheral constriction. In this phase of renal ischemia, renal vascular constriction and anuria may persist even though the arterial pressure rises to 100 mm. Provided it does not continue too long, restoration of renal function rapidly follows restoration of the general circulation. The second, or renal damage phase of renal shock develops if the ischemia continues for a sufficient number of hours. The most obvious resultant damage is seen in the cells of the loop of Henle and of the distal tubules. Tubular reabsorption of excretory products from the glomerular filtrate appears to be the most probable cause of renal failure in this phase. Provided the renal damage is not too great, gradual recovery of the kidneys may occur.

In fatal cases, anuria or inadequate excretion persists and death in uremia occurs within 2-20 days.

To decrease the risk of death due to postshock uremia, the duration of the shock should be made as short as possible by quickly restoring the circulating blood volume. Sodium bicarbonate should be administered if acidosis is present. Although a large volume of fluid may be required to restore the blood volume and hydration, an excess should be avoided, and the administration may be guided by repeated measurements of the blood and serum specific gravities.

If anuria or excretion of urine of low volume and specific gravity persists after recovery from acute shock, and the blood urea continues to rise, a diet high in carbohydrates and fat, and low in protein should be given to retard the accumulation of catabolites. Vividiffusion or peritoneal irrigation may retard the onset of uremia and increase the opportunity for the recovery of renal function.

W. G. B. Casselman

Life Situations, Emotions and Gastric Function: A Summary. S. Wolf and H. G. Wolff: American Practitioner, **3**, 1-14 (Sept. 1948).

In this report the extensive investigations carried out on four fistulous patients to determine the changes in gastric function under the exigencies of environment and emotion are precisely described and illustrated. The experiments were carefully planned and executed and the conclusions are of great practical value. This article is therefore a "must" for all medical students, in the study and understanding of gastric dysfunction and disease.

Miss H. A. P. Marcroft

Clinical Course of Chronic Nonspecific Ulcerative Colitis. J. B. Kirener, W. L. Palmer, S. N. Maimon, and W. E. Ricketts: J. Amer. Med. Assn. **137**, (11) 922 (1948).

This study emphasizes the fact that nonspecific ulcerative colitis is a chronic disease, the course of which is characterized by frequent exacerbations and remissions. In spite of evidence of a retrograde spread of the process from the anus to the terminal part of the ileum in certain patients, it is surprising to note how often the initial involvement seems to be the maximum involvement as determined radiologically. Proctoscopic evidence of improvement during remissions is usually obtained. Radiological proof of regression is rare, occurring in only 12% of the patients studied. The mortality rate is highest in young patients with severe symptoms during the initial 1-2 years of illness. The predominant precipitating factors seem to be emotional stress, acute infections of the respiratory tract and physical fatigue. The most important complications are nutritional (cachexia, anemia, fatty degeneration of the liver) and local (perforation, abscess, fistula, stricture, neoplastic hyperplasia). Complete and lasting cure following medical management is rare (6% in this series), while following ileostomy no cures of the disease process have been observed. On the other hand, after medical management, it has been possible to maintain 47% of the patients in a "satisfactory" state of health while

19%, though not markedly improved are, however, not significantly incapacitated. Surgical treatment of 19 patients restored 14 to satisfactory health and 5 died. Under medical treatment, there were 9 deaths (11% of those treated medically), 6 of which were before 1942. The effect of more modern methods of therapy, by nutritional, antibiotic and psychiatric means, upon the course of the disease remains to be ascertained.

Miss J. E. Wood

OBSTETRICS

The Prognosis of the Cardiac Patient in Pregnancy. S. Lesse: Am. J. Obs. Gyn. **56,** 477-483 (Sept., 1948).

This paper presents the findings and conclusions from a series of 203 proved cardiac patients followed through pregnancy and delivered at the Jefferson Medical College Hospital. Of the patients developing failure, 71% had a previous history of decompensation while 18% had none.

Using Pardee's functional classification which divides heart disease into four classes ranging from Class I, showing no discomfort during usual physical activity to the "cardiac cripple" of Class IV, the author found that 12.7% of Class I, 46.5% of Class II, 90.9% of Class III and 100% of Class IV showed some signs of insufficiency at some period during pregnancy. He goes on to conclude from the considerable number of Class I and II patients that gave trouble that a purely functional classification of cardiac decompensation is inadequate insofar as prognosis is concerned and he suggests an anatomical basis as well.

The statistics also indicate that the older the cardiac patient the greater the risk she runs during pregnancy, whereas parity does not seem to play a significant role, assuming similar past histories. Mitral stenosis is by far the commonest condition affecting prognosis.

Of the 54 cases that decompensated, 47 did so before labour, one during labour and 6 in the puerperium. These 203 cases represent 3.2% of 6,285 consecutive pregnancies and of these there were 3 deaths, all occurring in the puerperium.

B. Cowitz

NEUROLOGY

Pain Mechanisms and the Frontal Lobes. W. Freeman and J. Watts: Ann. Int. Med. **28**, 747-754 (April, 1948).

Prefrontal lobotomy has been used successfully for the relief of emotional reactions to acute intractable pain in cases of painful stump and phantom limb, atypical facial neuralgia, crippling arthritis, mucous colitis of many years' duration, anginal syndromes, neuralgia following herpes zoster, causalgia which has failed to respond to multiple cordotomies, tabes dorsalis, certain brain lesions and cancer. The operation appears to relieve the disabling reaction of pain evidently through elimination of the emotional component arising from the thalamus. After lobotomy pain becomes an experience rather than an emotion, a fact rather than a threat.

A. C. Parkin

PAEDIATRICS

Congenital Anomalies Requiring Early Recognition and Immediate Treatment. W. J. Wilson: Bull. Acad. Med. Toronto. **22,** 7-15 (Oct., 1948).

The congenital anomalies which can be treated surgically should be recognized early. The responsibility for making the early diagnosis rests with the obstetrician, pediatrician or general practitioner. The author discusses erythroblastosis fetalis, congenital atelectasis of the lungs, oesophageal atresia, diaphragmatic hernia, pyloric stenosis, atresia of the bile ducts, herniation of abdominal viscera into the base of the umbilical cord (omphlalocoele), congenital obstruction of the intestine, imperforate anus and spina bifida, stressing diagnostic signs and optimum time for surgical treatment.

Miss E. J. Gear

Socio-Emotional Factors Accounting for Growth Failure in Children Living in an Institution. R. Fried and M. F. Mayer: J. Ped. **33,** 444-456, (Oct., 1948).

The importance of socio-emotional adjustment during the active growth period of children should never be under-estimated. Physical hygiene, medical supervision and good general management are in themselves not sufficient to ensure satisfactory physical development. These conclusions have been borne out by the work of the authors during the past six years at Bellefaire, a home for dependant and neglected children, in Cleveland, during which time extensive use has been made of the Wetzel Grid method of measuring growth. The types of growth failure most commonly observed have

been: (1) simple malnutrition and (2) obesity, occurring in about 40% of the children.

In the authors' opinion, it is a mistake to consider any form of growth failure as due to solely physical causes. There was in most of the children with growth failure a close parallelism between physical affliction and socio-emotional adjustment. Onset and recovery in the one was accompanied quite simultaneously by corresponding progress in the other. The great majority of children who showed either, showed both and the disturbances were roughly equal—milder and severer forms of physical growth failure being associated with corresponding degrees of emotional maladjustment.

Miss H. A. P. Marcroft

PSYCHIATRY

Erratum: Vol. XXVI, No. 1, Page 33

The reference for **Psychothearpy in Gereral Practice** should read: J. Amer. Med. Assn. **137** (5) 442-448 (May, 1948).

Bilateral Fractional Resection of Frontal Cortex for the Treatment of Psychoses. R. G. Heath and J. L. Pool: J. Nerv. and Ment. Dis. **107**, 411-429 (May, 1948).

This is the first report of bilateral removal of cortical tissue in the absence of gross cellular pathology. The aim of the operation is to obtain improved behaviour while avoiding the complications frequently noted after prefrontal lobotomy, such as deleterious alterations of behaviour and persisting incontinence. Parts of Brodmann's areas 9 and 10 were removed bilaterally and in the four cases reported included the medial or parasagittal portion of the superior frontal gyrus, and approximately the rostral third of this gyrus and an adjacent portion of the middle frontal gyrus. Of the four cases reported, two made social recoveries, one showed improvement and one remained unchanged.

A. C. Parkin

PUBLIC HEALTH

The Connaught Medical Research Laboratories 1914-1948. R. D. Defries: Can. J. Publ. Health, **39**, 330-344 (Aug. 1948).

The development of the Connaught Medical Research Laboratories is outlined. In the early part of World War I, Col. Gooderham donated 57 acres of land and buildings valued at $75,000 to provide accommodation in which Dr. J. G. FitzGerald and his associates could produce tetanus antitoxin. The laboratories were named after H.R.H. the Duke of Connaught who was then Governor-General of Canada. Further grants from the Province of Ontario and the Rockefeller Institute have provided for expansion of the original laboratories, the erection in 1924 of the School of Hygiene Building and the acquisition of the Spadina Division. In 1935 a Western Division was formed with headquarters at U.B.C. During the past 34 years many medical advances have been made in the laboratories including improved production of insulin, the preparation of diphtheria, tetanus and staphylococcus toxoids, the purification of liver extracts and heparin, the production of dried human blood serum, penicillin, influenza and typhus vaccine and gas gangrene antitoxin. The names of many world-famous scientists are linked with these discoveries and the Connaught Laboratories.

G. L. Ralph

Relation of Economic Status to Tuberculosis Mortality by Age and Sex. M. Terris: Am. J. Pub. Health, **38**, 1061-1070 (Aug. 1948).

Surveys carried out in England, Wales, United States and Germany indicate that the tuberculosis mortality rate varies inversely with the economic status as represented by occupation and family income. The factors responsible for this relationshp include: overcrowding, inadequate housing, poor nutrition, heavy manual labor and increased exposure to infection.

The tuberculosis mortality rate for males of the working class is twice as great as for males in the professional and salaried classes. For females, the morality rate in the working class was one and one-half times that in higher classes. The factors here are probably: (1) that more men than women are engaged in strenuous work with low incomes, (2) that needed hospitalization was postponed for bread-winners, (3) that men are exposed to silicosis, and (4) that men are more likely to have extra-familial exposure.

Miss A. Ramcharan

Tetanus Toxoid—The Recall Dose. F. O. Wishart and L. K. Jackson: Can. J. Pub. Health, **39**, 181-186 (May, 1948).

A group of 149 young adults, the great majority of whom had been previously immunized with tetanus toxoid while in the armed forces, was selected for study. The group was sub-

divided into two, one receiving a 0.1 cc. dose and the other a 1.0 cc. dose of tetanus toxoid. Blood samples were taken prior to and four weeks after the toxoid injection, for the determination of the antitoxin titre. The reactions were read at 24 hours.

Both doses of toxoid used were shown to be effective recall doses. In the group receiving the 1.0 cc. dose, 100% responded with an overall increase in antitoxin level of 32 times the original, while 80% developed a level of 10 units or more. Using the 0.1 cc. dose only 83.6% responded with an overall increase in antitoxin level of seven times. This latter recall dose may be subminimal in some instances.

Reactions to the toxoid were less frequent in the group receiving a 0.1 cc. dose. Ten per cent of persons receiving the larger dose had general reactions which were, however, seldom incapacitating. Future refinement of the antigen may reduce the percentage of reactions. A follow-up is being carried out to determine the duration of the antitoxin response.

Miss H. A. P. Marcroft

SURGERY

Mesenteric Vascular Occlusion. J. D. Rivers, L. H. Strug and I. M. Essrig: Ann. Surg. **127**, 887-906 (May, 1948).

This article discusses obstruction of mesenteric vessels from causes other than local infection or injury. Several points are established first: (1) the vessels have free submucous anastomoses, so that in obstruction proximal to the terminal arcades there is adequate collateral circulation, (2) a gradual occlusion is well tolerated, (3) recurrences are likely in portal hypertension and mesenteric arteriosclerosis. Etiology of arterial obstruction is embolism (2/3 of cases) and arteriosclerotic thrombosis (1/3). The veins suffer thrombosis in portal hypertension and disseminated lupus erythematosus. Effects range from none to hemorrhagic infarcation with perforation. The clinical picture is similar in both arterial and venous block. In the case of sudden blockage, there may be a history of cardiac disease preceding an acute abdominal catastrophe with crampy pain, shock, nausea and vomiting accompanied by a leucocytosis. The condition may proceed to peritonitis if death does not supervene first. In the case of gradual occlusion there is vague mid-abdominal pain, nausea and vomiting, constipation or diarrhea; melena and hematemesis are inconstant, a doughy mass may be felt later and jaundice is occasionally seen. X-ray films show ileus, intestinal dilatation and free fluid in the abdomen. Treatment consists of control of any associated cardiac disorder, and an attempt to save the patient by resection of the affected intestine coupled with anticoagulant therapy.

Miss A. I. Scott

17-Ketosteroid Excretion and Liver Efficiency in The Postoperative Patient. D. R. Cooper and V. Iob: Univ. Hosp. Bull., Univ. of Mich. **14** (8), 75 (Aug. 1948).

Determination of urinary 17-ketosteroids in three patients revealed no significant increase during the immediate postoperative period.

Liver function, as indicated by the bromsulphalein retention test, was found to be uniformly depressed following operation. The greatest depression appeared to occur following operations of greater magnitude and during the first six postoperative hours. Sample values of percent retention after 45 minutes, preoperatively and 6 and 24 hours postoperatively, for a case undergoing a combined abdominoperineal resection are 3%, 45% and 39%; and for a case undergoing left lumbar sympathectomy, 5%, 10% and 8%. No correlation was found between liver function and anti-diuretic activity of the urine or serum of patients, as determiden by biological assay.

W. G. B. Casselman

Acute Cholecystitis. J. W. Barksdale and J. H. Johnston: Ann. Surg., **127**, 816-829 (May, 1948).

Etiological agents of this condition are: (1) obstruction of the cystic duct, (2) action of extrahepatic bile in the gall bladder and, occasionally, (3) secondary bacterial invasion. Obstruction initiates the process in 95% of cases with a resultant rise of intravesical pressure. Vascular interference and rupture may complicate this stage in 10-20%. Acute cholecystitis is an acute emergency and the policy of "watchful expectancy" should be avoided because of the paucity of symptoms, even in severe cases. A survey was taken of the attitude of general surgeons and it was found that there is a growing trend to early operation if within four days of the onset of symptoms, or conservative treatment if later. In general, cholecystectomy is the operation of choice, and cholecystostomy only if absolutely necessary. Dangerous periods for

operation are: (1) initial period of electrolyte imbalance, (2) between third and tenth days after onset and (3) during subsiding acute attack.

Miss A. I. Scott

Streptomycin in the Surgery of Pulmonary Tuberculosis. J. D. Murphy: Surg. Obs. Gyn. 87, 546-548 (Nov. 1948).

This study was done in the United States by the medical section of the Veterans' Administration to determine whether or not streptomycin provided any protection against post-operative spread, reactivation or empyema in patients subjected to thoracoplasty or pulmonary resection for tuberculosis. Alternate patients undergoing thoracoplasty were given streptomycin. However in view of the 25% mortality rate in pulmonary resection for tuberculosis from 1942-1947, all such patients received streptomycin, past records being used for comparison.

In 699 operations for thoracoplasty on patients receiving 1-2 gms. streptomycin daily, 2% developed post-operative spread and 1.1%, wound infection. In the control group of 648 patients, 5.6% developed spread and 2.4% wound infection. These figures would seem to indicate a significant decrease in post-operative complications but the decrease was not found universally and some pre-streptomycin results were equally good. Also in view of the fact that streptomycin was given over a period of 9 weeks, with resistance developing consistently in 6 to 8 weeks, it was felt that such a regimen was not satisfactory for routine thoracoplasties. However it might be used where the tuberculous process was too widespread to permit thoracoplasty otherwise.

In 129 operations for pulmonary resection, the mortality rate was only 4.5%, along with a reduction in complications such as bronchopleural fistula and empyema.

The dosage of streptomycin during the first six months of this investigation was 2.0 gms. daily, and was reduced during the following six months to 1.0 gm. daily. No difference was observed between groups receiving different dosages.

Miss E. J. Gear

Obscure Axillary Lymph Node Metastases in Carcinoma of the Breast. O Saphir and G. D. Amromin: Cancer.

In this study axillary lymph nodes removed from thirty patients with carcinoma of the breast, which on routine examination had been reported uninvolved, were restudied histologically by means of serial sections. In one-third of these cases, carcinoma cells were discovered by this procedure. In no case was there any gross evidence of metastases or any significant alteration in size, consistency or appearance of the node involved.

The need to carry out complete surgical removal of all the axillary glands and to make more careful and thorough examinations of these structures is emphasized. In the authors' opinion the only means to rule out metastases is the examination of serial sections. This is essential for a correct prognosis and evaluation of the results of surgery.

R. F. Hetherington

RECENT ACCESSIONS TO THE MEDICAL READING ROOM

Addis, T.: **Glomerular nephritis.** 1948.
American Association of School Administrators: **Health in schools.** 1942.
Brown, E. L.: **Nursing for the future.** 1948.
Cogan, D. G.: **Neurology of the ocular muscles.** 1948.
Dameshek, W. and Estren, S.: **The spleen and hypersplenism.** 1947.
Endocrinology of neoplastic diseases, A symposium. 1947.
Flu, P. C.: **The bacteriophage.** 1946.
Génève. Université. Faculté de Médecine: **La douleur et son traitement.** 1944.
Gumpert, M.: **Samuel Hahnemann.** 1934.
Horsley, J. S.: **Narco-analysis.** 1943.
Löbel, J.: **Robert Koch.** 1935.
Meigs, J. V. (ed.): **Progress in gynecology.** 1946.
Papanicolaou, G. N.: **The epithelia of women's reproductive organs.** 1948.
Riddle, O. and others: **Studies on carbohydrate and fat metabolism.** 1947.
Sâo Paulo. Profilaxia da Lepra, Departamento de Biblioteca: **Indice bibliográfico de lepra, 1500-1945.** 1948.
Snow, W.: **Clinical roentgenology of pregnancy.** 1942.
Szent-Györgyi, A.: **Nature of life: a study on muscle.** 1948.
Transvaal Chamber of Mines. Co-ordinating Committee for the Investigation of Sporotrichosis: **Sporotrichosis infection in mines of the Witwatersrand, A symposium.** 1947.

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The demonstration of pinworms in one member of a family should render the entire family suspect, and all infested individuals should be treated simultaneously.

Fortunately, 90% of cases can be cured within a short time with little inconvenience. Clinical records show that the most effective treatment is the administration of gentian violet, in the form of tablets, Vermilet "Frosst". These tablets are specially made to pass undissolved through the stomach and to dissolve in the lower part of the ileum.

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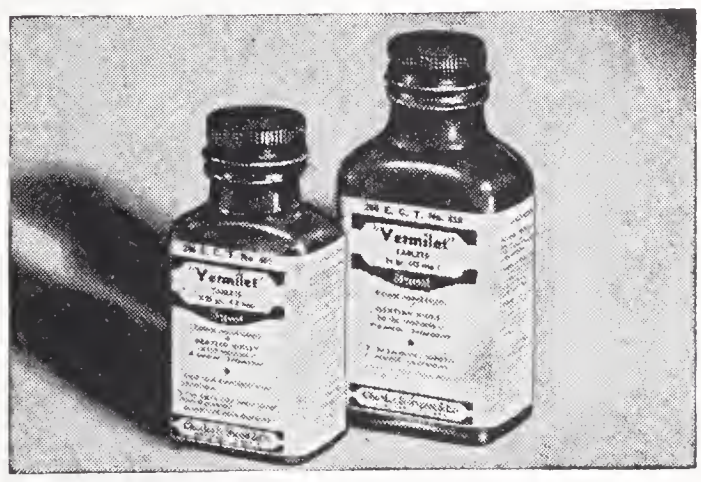
INFANTS:—Under three years of age 3/20 gr. (9.6 mg.) for each apparent year of age. For children unable to swallow a tablet, it is suggested that the tablet be concealed in a teaspoonful of oatmeal, and the child will swallow the tablet with a bolus of oatmeal.

CHILDREN:—Over 3 years of age, 3/20 gr. (9.6 mg.) for each apparent year of age, divided in three parts and taken before meals. From 10 to 16 years of age, one tablet of ½ gr. (32 mg.) three times daily before meals.

ADULTS:—Two tablets of ½ gr. (32 mg.) three times daily before meals.

Repeat dose daily for 8 days, rest for one week, then repeat dose for additional 8 days. No patient should be discharged as cured unless 3 or 4 swabs, examined at intervals of a week apart, show absence of ova.



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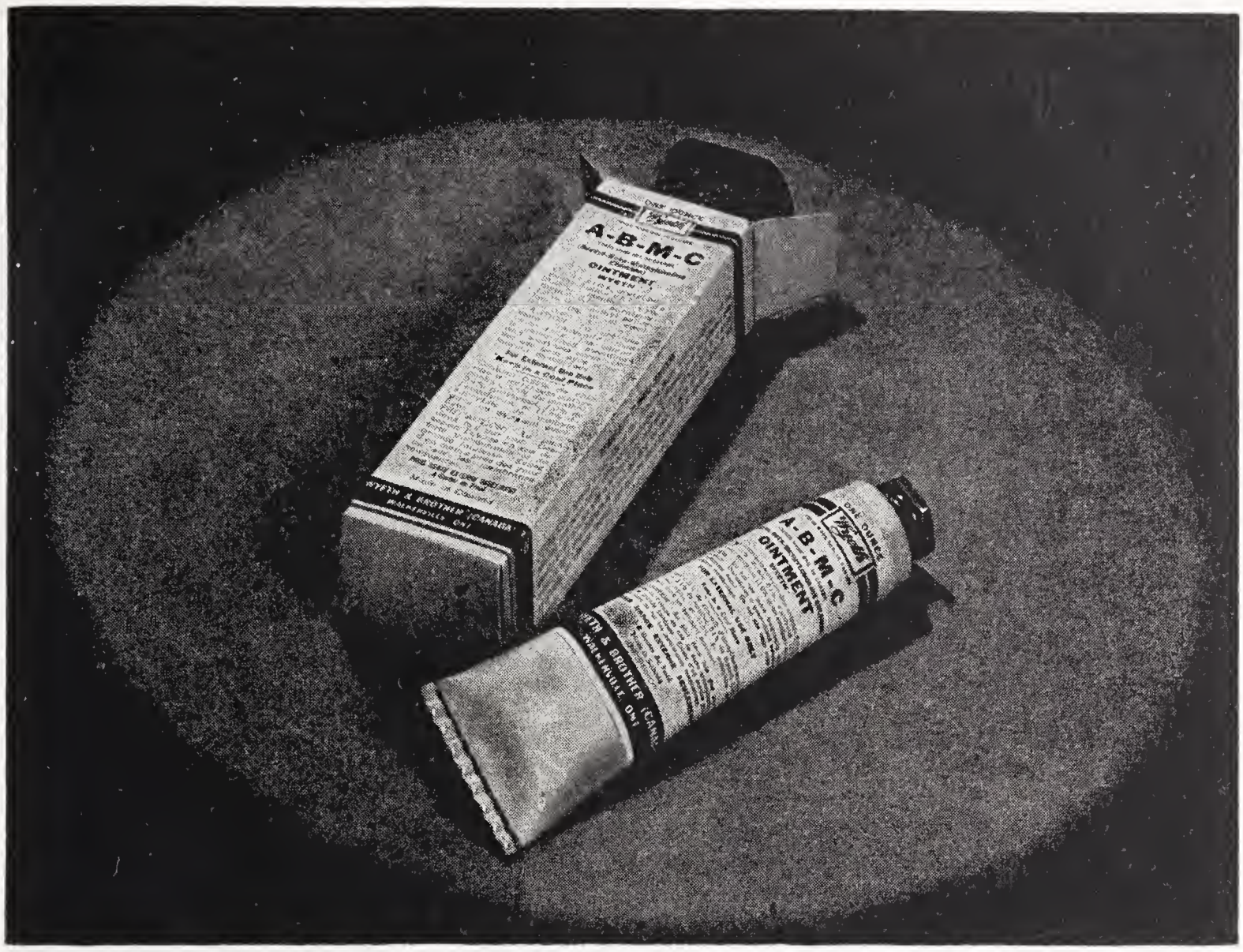

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Physicians are consulted many times about "upset stomach" and often after exhaustive investigation, come to the conclusion that there is no organic disease present and that the condition is probably due to one of the causes enumerated above. General instructions as to method and time of taking food, not eating while aggravated, etc., may all be very well, but are seldom carried out by the patient.

It will be found, more especially in patients with gastric neurosis, that a dose of "Sedalka" after each meal will neutralize excess gastric acid, mildly sedate the patient, and that the combination of these effects will tend to relieve patients suffering with gastric neurosis.

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